



**Washington State
Department of Transportation**

Washington State Bridge Inspection Manual

M 36-64.10

March 2019

Bridge Preservation Office/Local Programs

Americans with Disabilities Act (ADA) Information

English

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The *Washington State Bridge Inspection Manual* (WSBIM) is published jointly by the Bridge and Structures and the Local Programs offices of the Washington State Department of Transportation (WSDOT). This manual is the primary source of information and guidance for those who inspect bridges subject to the National Bridge Inspection Standards (NBIS), the National Tunnel Inspection Standards (NTIS) and managed by state and local agencies within Washington State.

This publication is the official source for all information relevant to Washington State's compliance with the NBIS, the National Bridge Inventory, the NTIS, the National Tunnel Inventory, and the Washington State Bridge Inventory. It is also the official source of information for the inspection of bridges* and selected structures on state right of way that are not subject to the NBIS, and for the recordkeeping requirements for these bridges and selected structures in the Washington State Bridge Inventory.

The WSBIM is managed by the Bridge Inspection Committee composed of individuals listed in this document. Suggestions for improvement and updating the manual are always welcome. All questions and comments regarding this manual will be reviewed by this committee and incorporated into subsequent revisions as appropriate.

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Purpose

The *Washington State Bridge Inspection Manual* (WSBIM) has been developed to provide specific guidance, offer needed technical details, and serve as an information source to both state and local agency staff related to and involved with bridge inspections within the state of Washington. The intent of this manual is to serve as an operations manual for the collection, processing and reporting of bridge inspection information.

The WSBIM consists of nine chapters. Chapters 1 – 3 explain the responsibilities within the bridge inspection organization, provide guidance to the structure of the Washington State Bridge Inventory System (WSBIS), and it further explains the types of inspections and the reports required to meet the federal mandate outlined in the Code of Federal Regulations. Chapter 4 describes the Washington State Bridge Management System (BMS) and defines the element level inspection used by both state and local agency bridge inspectors. Chapters 5 – 7 provide more detailed information to the inspector in regard to load ratings, scour, damage/repair reporting, and quality control/quality assurance. Chapter 8, currently written as a stand-alone chapter, covers the aspects of mechanical and electrical inspections of moveable structures. Chapter 9 is a new addition to the manual in 2017 and integrates the operation of tunnel inspections into the overall inspection program.

References

Bridge inspection staff may also refer to the most current editions of the following:

- *Bridge Inspector's Reference Manual* (BIRM), Publication No. FHWA NHI 12-049
- *The Manual for Bridge Evaluation* (MBE), 2nd Edition, AASHTO
- *The Manual for Bridge Element Inspection*, 1st Edition, AASHTO
- *Evaluating Scour at Bridges*, Hydraulic Engineering Circular (HEC) No. 18, 5th Edition, FHWA
- *Stream Stability at Highway Structures*, Hydraulic Engineering Circular (HEC) No. 20, 4th Edition, FHWA
- *Bridge scour and stream instability countermeasures*, Hydraulic Engineering Circular No. 23, 3rd Edition, FHWA
- Title 23 CFR 650 Subchapter C – National Bridge Inspection Standards
- Title 23 CFR 650 Subchapter E – National Tunnel Inspection Standards
- Title 23 CFR 500 Subchapter F – Transportation Infrastructure Officials
- *Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges*, Report No. FHWA-PD-96-001, December 1995, FHWA available at www.fhwa.dot.gov/bridge/mtguide.pdf.
- *Transportation Engineering Technology Highway Design – Program Detail Manual*, 5th Edition, NICET (Requirements for NICET certification) available at www.nicet.org/default/assets/File/hwydes.pdf.
- *Bridge Design Manual* (BDM) M 23-50, WSDOT
- *Transportation Structures Preservation Manual* M 23-11, WSDOT
- *Local Agency Guidelines* (LAG) M 36-63, WSDOT

- *Bridge List M 23-09*, WSDOT
- *Moveable Bridge Inspection, Evaluation, and Maintenance Manual*, 1st Edition, AASHTO
- *Dive Safety Manual*, WSDOT (currently an internal BPO Manual)

Revisions

The WSBIM is a dynamic document that is updated periodically to incorporate revisions based on new requirements from the Federal Highway Administration (FHWA), as well as newly adopted practices by either state or local agencies within the state. We encourage the user to submit to the Bridge Inspection Committee any proposed revisions or new material, by using the Comment Request Form provided.

In the event of conflicting information or requirements between the WSBIM and NBIS, the NBIS will govern. Agencies are not relieved of the responsibility of complying with the NBIS even when a conflict exists. If a conflict is discovered, notify the WSDOT Bridge Preservation Supervisor or the Local Agency Bridge Engineer.

Chapter 1 *Bridge Inspection Organization Requirements*

1-1 **General**

The National Bridge Inspection Standards (NBIS) are published in the Code of Federal Regulations, 23 CFR 650, Subpart C. The NBIS sets the national standard for the proper safety inspection and evaluation of bridges and it applies to all structures defined as reportable structures located on all public roads.

The National Tunnel Inspection Standards (NTIS) are published in the Code of Federal Regulations, 23 CFR 650, Subpart E. The NTIS sets the national standard for the proper safety inspection and evaluation of all highway tunnels on all public roads, on and off Federal-aid highways, including tribally and federally owned tunnels.

Washington State's bridge* inspection organization is required to meet the NBIS, NTIS, and functions under the authority of the Federal Highway Administration (FHWA) and state law. Washington State's bridge inspection organization, however, is only responsible for state and local agency-owned bridges and tunnels. Federally-owned bridges are inventoried and managed by federal agencies. Privately-owned highway bridges are not included in this requirement, although WSDOT encourages private bridge owners to inspect and maintain their bridges in conformance with the NBIS, NTIS, and this manual. There is an open invitation for private bridge owners to submit bridge records to the Washington State Bridge Inventory System (WSBIS).

1-1.1 **Definitions**

BEIS – Bridge Engineering Information System. The WSDOT internal website that holds electronic bridge files.

Bridge – All reportable structures that include bridges, culverts, and tunnels. See also definition of Reportable Structure below.

BridgeWorks – The software application that is used to record, process and report bridge inspections and which updates data in the inventory databases.

Bridge Condition Inspection Training (BCIT) – A comprehensive ten day training course offered by WSDOT based on the 2012 FHWA "*Bridge Inspectors Reference Manual (BIRM)*". The BCIT is an FHWA accepted equivalent to the course offered by the National Highway Institute (NHI), entitled "Safety Inspection of In-Service Bridges" with a course code of FHWA-NHI-130055.

Bridge File – A file containing historic and current information about a bridge, and meeting the intent of Chapter 2 of the *AASHTO Manual for Bridge Evaluation*.

Bridge Inspection – The act to assess the structural condition and collect pertinent data while on site of in-service bridges.

*Bridge(s) is intended to mean all reportable structures which include bridges, culverts and tunnels.

Bridge Inspection Certification – A process by which a Program manager, Team Leader and Underwater Bridge Inspection Diver is certified in the state of Washington to perform bridge inspections. See Section 1-5.

Bridge Inspection Committee (BIC) – A committee of state and local agency representatives that provides overall advisory input to the bridge inspection manual content and organization within the state of Washington. The current list of committee members is located within the Foreword of this manual.

Bridge Inspection Organization – See Section 1-2.

Bridge Inspection Program – An organizational unit that functions as part of the Bridge Inspection Organization and that meets the requirements of 23 CFR 650.307, 23 CFR 650.507, and this manual. Agencies involved with the Bridge Inspection Program are led by delegated program managers, who work in coordination with the Statewide Program Manager.

Bridge Inspection Refresher Training (BIRT) – A training course designed to refresh the skills of practicing bridge inspectors. The course is offered by the National Highway Institute (NHI). The course code is FHWA-NHI-130053.

Critical Finding – The NBIS gives the following definition: “A structural or safety related deficiency that requires immediate follow-up inspection or action.” WSDOT defines a critical finding/critical damage as a condition that necessitates closing, posting, or restriction of a bridge or a portion of a bridge due to an identified structural deficiency requiring structural repair(s) before it can be reopened to unrestricted traffic in the original configuration.

Culvert – A curved or rectangular buried conduit for conveyance of water, vehicles, utilities, pedestrians or animals.

Delegated Program Manager (DPM) – See Section 1-4.2

Fracture Critical Member – A steel load path member in tension, or with a tension element, whose failure would probably cause a portion of or the entire bridge to collapse.

Highway LID – A structure built with green space which interconnects neighborhoods otherwise cut off or impacted by freeways, with or without local roads. If carrying local roads, the structure must have a deck area at least twice the area of the roads it carries. Highway “LIDS” shall be inventoried as tunnels under the NTIS.

Inventory Record – Data which has been coded according to this manual for each structure carrying public road traffic and/or for each inventory route which goes under a structure.

Inventory Route – The route for which the applicable inventory data is to be recorded. The inventory route may be on the structure or under the structure. Generally, inventories along a route are made from west to east and south to north.

Local Agency – Generally refers to city or county bridge owners but also includes all bridge owners other than state and federal.

National Bridge Inspection Standards (NBIS) – Title 23 Code of Federal Regulations 650 Subpart C defines the NBIS regulations, and establishes requirements for inspection procedures, frequency of inspections, qualifications of personnel, inspection reports, and preparation and maintenance of a state bridge inventory. The NBIS apply to all structures defined as bridges located on all public roads.

National Bridge Inventory (NBI) – The aggregation of structure inventory and appraisal data collected nationally to fulfill the requirements of the National Bridge Inspection Standards. The state of Washington shall prepare and maintain an inventory of all bridges subject to the NBIS.

National Tunnel Inspection Standards (NTIS) – Title 23 Code of Federal Regulations 650 Subpart E defines the NTIS regulations, and establishes requirements for inspection procedures, frequency of inspections, qualifications of personnel, inspection reports, and preparation and maintenance of a state tunnel inventory. The NTIS apply to all structures defined as highway tunnels located on all public roads.

Public Road – Any road under the jurisdiction of and maintained by a public authority and open to public travel.

Reportable Structure – The NBIS gives the following definition: “A structure including supports erected over a depression or an obstruction, such as water, highway, or railway, and having a track or passageway for carrying traffic or other moving loads, and having an opening measured along the center of the roadway of more than 20 feet between undercopings of abutments or spring lines of arches, or extreme ends of openings for multiple boxes; it may also include multiple pipes, where the clear distance between openings is less than half of the smaller contiguous opening.”

The State – The Washington State Department of Transportation (WSDOT).

Statewide Program Manager (SPM) – See Section 1-4.1

Super User – Bridgeworks/WSBIS account that has permissions that allows user to approve changes (release) in the application that other users do not have sufficient permissions to perform. Examples of these types of data changes are changes of Program Manager, changes to the owner, and obsoleting of structures.

Tunnel – The term “tunnel” means an enclosed roadway for motor vehicle traffic with vehicle access limited to portals, regardless of type of structure or method of construction, that requires, based on the owner’s determination, special design considerations that may include lighting, ventilation, fire protection systems, and emergency egress capacity. The term “tunnel” does not include bridges or culverts inspected under the National Bridge Inspection Standards (Title 23 Code of Federal Regulations 650 Subpart C). The state of Washington shall prepare and maintain an inventory of all tunnels subject to the NTIS.

Washington State Bridge Inventory System (WSBIS) – The aggregation of structure inventory, and appraisal data collected and used to fulfill the requirements of the NBIS and additional data used to manage the state and local bridge inventories.

1-2 Description of Bridge Inspection Organization

In Washington State, the bridge inspection organization is structured as a collaborative effort between the Washington State Department of Transportation (WSDOT) Bridge Preservation Office (BPO), WSDOT Local Programs Office (LP), and local agency bridge owners with the Federal Highway Administration (FHWA) as a primary stakeholder. Collectively, all state and local agency owned bridges subject to the NBIS and NTIS are managed under this organization. The inspection organization is led by the State Bridge Preservation Engineer (who serves as the Statewide Program Manager) and is advised by the Bridge Inspection Committee.

The bridge inspection organization has the following responsibilities:

- Establishing an organizational structure within the state that clearly defines the roles and responsibilities of those agencies required to participate.
- Maintaining personnel qualification records and a certification program for program managers, team leaders, load raters and underwater bridge inspection divers.
- Performing regularly scheduled in-service bridge inspections. This includes, but is not limited to, routine (low/high risk), underwater (low/high risk) and fracture critical inspections.
- Performing regularly scheduled in-service tunnel inspections.
- Establishing state specific load rating procedures and maintaining load ratings based on current conditions of all NBI and NTI reportable structures.
- Following MBE criteria for load posting/restricting bridges.
- Establishing and specifying written inspection procedures for:
 - Fracture Critical Bridge Members
 - Underwater Bridge Elements
 - Complex Bridge Features
- Performing scour evaluations for all bridges over water.
- Maintaining scour Plan of Action (POA) documents for all bridges documented to be vulnerable to scour.
- Establishing quality control and quality assurance procedures to maintain a high degree of accuracy and consistency within the inspection program.
- Responding to and reporting of significantly damaged bridges to the FHWA Washington Division Bridge Engineer.
- Maintain a separate inventory of bridges and tunnels for the entire state.
- Maintaining a bridge/tunnel file (electronic and/or physical) for every bridge/tunnel in the inventory.
- Maintaining National Bridge Inventory (NBI) data that follows the Federal Coding Guide criteria or can be translated into that system during the annual submittal of data.
- Maintaining National Tunnel Inventory (NTI) data that follows the Specifications for the National Tunnel Inventory criteria for the annual submittal of data.
- Maintaining Bridge Management System data that follows the National Bridge Element (NBE) condition assessment criteria or can be translated into that system during the annual submittal of data.
- Submitting required Washington bridge inventory data to FHWA for incorporation into the National Bridge Inventory (NBI).
- Submitting required Washington tunnel inventory data to FHWA for incorporation into the National Tunnel Inventory (NTI).

The bridge inspection organization's activities also include the following which although are not explicitly required by the NBIS, NTIS, but are either strongly implied or required by other FHWA policies:

- Responding to FHWA Technical Advisories, FHWA Action Memoranda, and other policy or information requirements provided by the FHWA Washington Division Bridge Engineer.

The bridge inspection organization is also responsible for the following activities which are clearly part of managing bridges but not required by the NBIS.

- Bridge repair management.
- Managing non-NBIS structures.

1-3 Bridge Inspection Programs

The composition and size of each bridge inspection program varies widely, generally depending on the number of bridges/tunnels managed by each agency. Two state offices play key roles in the organization:

- **Bridge Preservation Office (BPO)** – This office is dedicated to running the bridge inspection program for all state owned bridges and tunnels. This includes bridges and tunnels managed by State Parks, General Administration, and other state agencies with bridges/tunnels subject to the NBIS and NTIS. BPO also co-manages bridges on the border with Oregon and Idaho. The BPO is led by the Bridge Preservation Engineer who also functions as the Statewide Program Manager.
- **Local Programs (LP)** – This office provides support and services to local agency bridge inspection programs. In particular, LP provides training, manages the inspector certification program, and many aspects of the local agency bridge and tunnel inventory data. The WSDOT Local Programs Bridge Engineer (LPBE) functions as a delegated program manager for all local agency bridges and tunnels.

Local agencies have a wide variety of bridge/tunnel inspection programs, which generally fall into the following categories:

- Local agencies with a delegated program manager and bridge/tunnel inspection staff working directly for them.
- Local Agencies with a delegated program manager and agency contracts out to other agencies or consultants for completion of bridge/tunnel inspection work.
- Local agencies without a delegated program manager but with bridge/tunnel inspection staff.
- Local agencies without a bridge/tunnel inspection program. These agencies generally have agreements with other agencies or consultants to inspect and manage their bridges/tunnel.

1-4 Bridge Inspection Organization Roles and Responsibilities

The bridge inspection organization, and the various programs within it, are staffed by individuals who have defined roles and responsibilities described as follows.

1-4.1 *Statewide Program Manager (SPM)*

The Statewide Program Manager is the individual in Washington State who leads the bridge inspection organization. This position is held by the Bridge Preservation Engineer, who must ensure that the organization fulfills its NBIS and NTIS responsibilities, see Appendix 1-C. To qualify as the SPM, WSDOT requires this individual to have both a current Structural Engineering and Professional Engineering license and qualify as a certified team leader. The SPM must also be recertified on a regular basis by attending a refresher training class according to state policy. The certification process is described in detail in Section 1-5.

1-4.2 *Delegated Program Manager (DPM)*

A delegated program manager assumes duties of the program manager for the selected subset of bridges and tunnels under their direct control, See Appendix 1-D. To qualify as a delegated program manager, the individual must meet, at a minimum, the program manager requirements as described in the NBIS and NTIS. Delegated program managers must be recertified on a regular basis by attending a refresher training class according to state policy. The certification process is described in detail in Section 1-5.

Note: Although delegated program managers perform duties for the bridge inspection organization, overall responsibility for NBIS and NTIS compliance still resides with the Statewide Program Manager as defined by the NBIS and NTIS.

1-4.3 *Team Leader (TL)*

A team leader is in charge of an inspection team and responsible for planning, preparing, and performing the field inspection of bridges and/or tunnels. The team leader also makes repair recommendations and is responsible for initiating the critical damage procedures including full bridge or tunnel closure if deemed necessary. To qualify as a team leader, the individual must meet, at a minimum, the team leader requirements as described in the NBIS and NTIS. Team leaders must be recertified on a regular basis by attending a refresher training class according to state policy. The certification process is described in detail in Section 1-5.

1-4.4 *Assistant Inspector*

An assistant inspector (Co-Inspector) may accompany the team leader during field bridge/tunnel inspections. Typical duties include helping to organize bridge/tunnel inspection trips, taking measurements, compiling notes, and taking photographs. When assistant inspectors also fully participate in the inspection process and prepare inspection reports under the direct supervision of a team leader, this work provides qualifying experience towards certification as a team leader.

Note: The NBIS/NTIS does not set specific training or educational requirements for assistant inspectors. However, bridge/tunnel inspector training is recommended and available to all assistant bridge/tunnel inspectors to serve as a good foundation for beginning inspectors as well as being a requirement for advancement to team leader.

1-4.5 **Load Rating Engineer (LRE)**

A load rating engineer manages all aspects of maintaining current and accurate load ratings for bridges/tunnels they are responsible for in their inventory. Responsibilities include reviewing inspection reports for changed conditions that warrant revisions to the load ratings on file, revising load ratings as needed, creating new load ratings for new bridges/tunnels, and ensuring that the findings from load ratings are implemented. In particular, the load rating engineer must track bridges/tunnels that require posting and ensure that the bridge/tunnel inventory has current data from the load ratings.

Note: To qualify as a load rating engineer in the BPO, the individual must have 4 years of bridge design or load rating experience and a current Professional Engineering license.

1-4.6 **Underwater Bridge Inspection Diver (UBID)**

To qualify as an underwater bridge inspection diver, the individual must meet, at a minimum, the underwater bridge inspection diver requirements as described in the NBIS. The certification process is described in detail in Section 1-5.

Note: The BPO has a Dive Safety Manual that regulates the diving activities for the BPO UBID's.

1-4.7 **FHWA Division Bridge Engineer (DBE)**

The Washington Division Office of the FHWA has assigned a Division Bridge Engineer to work collaboratively with the bridge inspection organization. The DBE works directly with the SPM and LPBE on resolving issues of compliance and is an active member of the BIC. The DBE has federal authority to approve the policy and procedures of this manual as noted in the Foreword of this manual.

1-5 **Bridge/Tunnel Inspection Certification**

Certification for bridge/tunnel inspection work within the state of Washington is a two-fold process that consists of the initial certification and subsequent certification renewals for the SPM, DPM's, TL's, and UBID's. For the purposes of simplifying the explanation of this procedure, the general term program manager (PM) will be used in place of SPM and DPM. The following requirements will pertain to both positions unless otherwise noted.

1-5.1 **Initial Certification**

The minimum qualifications for prospective individuals are described within Sections 309 and 509 of 23 CFR 650, Subpart C and E of the NBIS and NTIS respectively. To ensure that these requirements are met, the following steps outline the process for those individuals seeking initial certification.

- Fill out the WSDOT Bridge/Tunnel Inspector Experience and Training Record form, see Appendix 1-A.
- Submit an electronic copy of the completed form along with the following applicable documents to the WSDOT Local Programs Bridge Engineer (LPBE) for review:
 - Higher education degree(s), certification as a Level III or IV Bridge Safety Inspection Inspector, or qualifying bridge/tunnel inspection experience.
 - Registered professional engineering license(s).

- Certificate of completion of an FHWA approved comprehensive bridge inspection course such as the *WSDOT Bridge Condition Inspection Training (BCIT)* course or the *NHI Safety Inspection of In-Service Bridges* course.
NHI Offers a 10-day course for general purposes or a 5-day course intended for Licensed Professional Engineers. In Washington State, for licensed P.E.'s, successful completion of the 5-day NHI course will be accepted for initial certification. For all other prospective candidates, successful completion of the BCIT or the 10-day NHI course or another FHWA approved course will be required.
- Certificate of completion of an FHWA approved comprehensive tunnel inspection training course and score 70% or greater on an end-of-course assessment.
- Certificates of completion for any special technical courses related to in-service bridge condition inspection.
- Any additional information documenting the bridge inspection experience of the applicant.
- Approved applicants are issued a WSDOT Inspection Identification Number that is acknowledged through an email response from the LPBE.
- In addition to the minimum qualifications, the SPM, TL's within the BPO, and the LPBE, are all required to be registered professional engineers in Washington State. The SPM must also be licensed in the state of Washington as a structural engineer.

1-5.2 Certification Renewal

Certification renewal ensures that the PM's, TL's, and UBID's in any agency maintain a minimum level of training in the latest practices and technology in the area of bridge inspections. The training may consist of inspection related courses, conferences, seminars and other sources of education deemed qualified by the SPM and LPBE. A list of approved courses is located in Appendix 1-B. This process within the State of Washington consists of a fixed five-year period established for each individual PM, TL and UBID. Within this five-year period, the following course credit hours are required for continuing education training.

- State PM and TL's and UBID's are required to have 80 hours.
- Local Agency PM's and TL's and UBID's are required to have 40 hours.

Five-year certification period

- The five-year certification period is to be managed between the individual and the designated PM.
- Depending on the individual's need, the *NHI Bridge Inspection Refresher Training (BIRT)* course or other State, local or other federally developed instruction course must be taken at least once during each five-year certification period.
- The hours for these two particular courses can only be counted once as credit during each five-year certification period.
- The hours from BIRT course count toward completion of the designated hours of continuing education training required to maintain certification.
- For purposes of ensuring enrollment in a BIRT course, the BIRT can be taken within six months either side of the established certification expiration date of the current five-year period for each employee to extend certification for the next five-year period. The employee should be placed under probation and a plan of corrective action created if the expiration date is exceeded by going beyond the five-year period. See Section 1-6.

- Complete a cumulative total of 18 hours of FHWA approved tunnel inspection refresher training over each 60-month period.

1-5.3 **Certification Roles and Responsibilities**

1. Employee Responsibilities:

- a. The PM, TL and UBID are responsible for maintaining an individual accounting of the approved training courses they have taken in the established five-year re-certification period.
- b. The PM, TL and UBID are responsible to attend training when scheduled and to seek out attendance when needed.
- c. Continuing education courses, seminars or conferences pertaining to bridge inspection work, that are not pre-approved as qualifying classes are to be submitted to the SPM or LPBE for consideration. The following information is needed when submitting a class to the SPM or LPBE for approval.
 1. Course/Conference title
 2. Course/Conference description
 3. Course/Conference duration
 4. Course/Conference date
 5. Explanation of how the course/conference provides the latest practices and/or technology in the area of bridge inspections.

Upon PM approval, the class will be added to the pre-approved class list.

2. Supervisor Responsibilities:

- a. Meet annually during the employee's annual evaluation to discuss training completed and overall status for re-certification.
- b. Ensure the employees have opportunity to attend training that qualifies for recertification.

1-6 **Bridge Inspection Certification Probation, Suspension, Decertification and Reinstatement**

To couple the process of certification above in Section 1-5, a process for decertification has been established to ensure that all PM's, TL's, UBID's are following the proper conduct of their respective positions.

Key Terms:

- **Appointing Authority** – The designated authority that oversees the sanctions of probation, suspension or decertification of a PM, TL and UBID.
- **Probationary Period** – A PM, TL or UBID is allowed to continue their duties for a prescribed timeframe in order to complete an approved Plan of Corrective Action.
- **Plan of Corrective Action** – A personalized plan approved by the Appointing Authority that identifies criteria the PM, TL, or UBID must complete within an established timeframe for inspection re-certification.
- **Suspension** – Temporary removal of inspection certification as PM, TL or UBID.

- **Decertification** – Permanent removal of inspection certification as PM, TL or UBID until a formal Plan of Corrective Action is administered by the Appointing Authority and fulfilled by the PM, TL or UBID.

Three examples in which a certified PM, TL or UBID may be placed on probation or suspended are listed below. Decertification can result immediately upon knowledge of conduct presented below or if the PM, TL or UBID does not meet the terms agreed upon in the plan of corrective action:

1. If a PM, TL or UBID does not fulfill the requirements for recertification (Section 1-5).
2. If a PM, TL or UBID is found to be using poor inspection practices or producing inadequate inspection documents as assessed by the QC/QA process.
3. If a PM, TL or UBID is found to be falsifying bridge inspection records, misrepresenting bridge hours on site or otherwise failing to meet general ethical standards.

Reinstatement of certification from suspension or completing probation requirements will require a formal plan of corrective action. This may be a simple process or more complex based on the nature of the situation.

This formal plan of corrective action consists of the following:

- The suspended PM, TL, or UBID will be notified in writing by the appointing authority that a plan of corrective action is needed.
- A plan of corrective action developed by the employee is to be approved by the appointing authority.
- Based on the circumstances in examples 1 and 2 above, the PM, TL, or UBID may be required to attend additional Bridge Inspector training classes beyond the continuing education requirements of Section 1-5 as specified by the appointing authority involved in the formal review. The PM, TL or UBID may also be required to receive additional field instruction by the direct supervisor.
- For the circumstance in example 3 above, the PM, TL or UBID may be subjected to more strict consequences as determined by the appointing authority.

A PM, TL or UBID who successfully completes the plan of corrective action will be considered to be in good standing. A PM, TL or UBID who does not satisfactorily complete the plan of corrective action may be decertified.

The DPM will notify the SPM when a PM, TL or UBID in a Local Agency is placed on probation or is suspended, as well as the resulting reinstatement or decertification.

1-7 Appendices

Appendix 1-A	WSDOT Bridge/Tunnel Inspector Experience and Training Record form
Appendix 1-B	Continuing Education Course List
Appendix 1-C	SPM delegation letter
Appendix 1-D	DPM delegation letter

WSDOT Bridge/Tunnel Inspector Experience and Training Record Form



**Washington State
Department of Transportation**

WSDOT Bridge/Tunnel Inspector Experience and Training Record

Applicant for Bridge/Tunnel Inspector Certification		Date	
Organization			
Education			
Institution	Major	Years	Degree
Professional Registration			
State	Branch/Agency	Registration Number	
Bridge/Tunnel Inspection Training			
Course	Hours	Sponsor	Dates
Special Technical Course			
Course	Hours	Sponsor	Dates
Bridge/Tunnel Inspection Experience			
Organization	Bridge Duties	Years	
To the best of my knowledge, the above information is true and accurate.			
Applicant's Signature _____		Date _____	
Having reviewed the above information, I conclude that this individual meets the minimum qualifications for a bridge/tunnel inspection team leader as specified in the current National Bridge Inspection Standards and National Tunnel Inspection Standards.			
Team Leader's Signature _____		Date _____	
Team Leader's Name (Print) _____		Title _____	

DOT Form 234-100
Revised 08/201

Appendix 1-B Continuing Education Course List

For the purpose of continued certification as the SPM, TL, or UBID within the Bridge Preservation Office, the following list of courses are examples of qualifying courses for bridge inspection with estimated hours to acquire the necessary continuing education hours in an established 5 year period for each individual employee.

WSDOT/LTAP – Bridge Condition Inspection Fundamentals (BCIF)	24 hours
WSDOT/LTAP – Bridge Condition Inspection Training (BCIT)	72 hours
WSDOT/LTAP – Bridge Condition Inspection Update (BCIU)	16 hours
WSDOT/LTAP – Bridge Inventory Coding	18 hours
NHI Safety Inspection of In Service Bridges	74 hours
NHI Bridge Inspection Refresher Training	18 - 20 hours
NHI Stream Stability and Scour at Highway Bridges for Bridge Inspectors	8 hours
NHI Stream Stability and Scour at Highway Bridges	24 hours
NHI Underwater Bridge Inspection	24 hours
NHI Fracture Critical Inspection Techniques for Steel Bridges	32 hours
NDT – Dye Penetrant Testing	12 hours
NDT – Magnetic Particle Testing	20 hours
NDT – Ultrasonic Testing	32 hours
PNW Bridge Maintenance Conference	Credit as appropriate
Bridge & Tunnel Inspectors' Conference	Credit as appropriate
Annual Inspection Process Change Meeting	Credit as appropriate
Western Bridge Engineers Seminar	Credit as appropriate

Additional courses, seminars or conferences of similar content can be considered for approval by the SPM or LBPE.

Documents available as reference and training material include but are not limited to the following:

- Washington State *Bridge Inspection Manual* (WSBIM)
- *Bridge Inspection Reference Manual* (BIRM)
- *The Manual for Bridge Evaluation* (MBE)
- *Timber Bridges Manual* (USDA)
- SNTI
- TOMIE
- WSDOT *Transportation Structures Preservation Manual*

Appendix 1-C SPM Delegation Letter



**Washington State
Department of Transportation**

Memorandum

January 31, 2018

TO: Harvey Coffman, Bridge Preservation Engineer
Bridge & Structures Office, Development Division

THRU: Jeff Carpenter, P.E.,
Director of Development Division, State Design Engineer

FROM: *RME* R. Marshall Elizer, Jr., P.E., PTOE
Assistant Secretary for Multimodal Development and Delivery

SUBJECT: Delegation of NBIS Program Manager for Statewide Bridge Inspection Program

This is to advise you that as the incumbent Bridge Preservation Engineer of the Bridge and Structures Office, you are hereby delegated authority as Program Manager for the statewide bridge inspection program, as defined in the National Bridge Inspection Standards 23 CFR 650.307(e), §650.307(c) (1), and §650.307(c)(2).

These duties may be further delegated to individuals meeting the qualifications of 23 CFR 650.309(a). However, the responsibility must remain with you as the Program Manager in accordance with 23 CFR 650.307(d).

RME:jf

cc: Jeff Carpenter
Mark Gaines
Debbie Lehmann, FHWA

Appendix 1-D DPM Delegation Letter



Washington State
Department of Transportation

Memorandum

August 2, 2018

TO: Tom Castor, P.E.
Marine Project Engineer
MS: TB-32

FROM: Harvey L. Coffman, P.E., S.E.
Bridge Preservation Engineer
MS: 47340

SUBJECT: Sub-delegation of Bridge Inspection Program Manager
for Washington State Ferry's

By authority granted to me as the Statewide Program Manager, I am sub-delegating to you as the Washington State Ferry's, WSF, Marine Project Engineer, Program Manager Duties for the federally reportable inventory of the WSF. These duties are defined in the National Bridge Inspection Standards (NBIS) 23 CFR 650.307(e), §650.307(c) (1), and §650.307(c) (2), for all WSF bridge inspection programs.

You may further sub-delegate these duties however; I do not expect that you will have a need to do so.

Please note, that the overall bridge inspection program responsibility must remain with the Bridge Preservation Engineer as the Statewide Program Manager in accordance with 23 CFR 650.307(d).

HLC: mms

cc: Jeff Carpenter, State Design Engineer
Mark Gaines, State Bridge and Structures Engineer
George Comstock, Coding & Appraisal Engineer
Debbie Lehmann, FHWA Washington Division Bridge Engineer

DOT Form 700-008 EF
Revised 5/99




Washington State
Department of Transportation

Memorandum

July 31, 2018

TO: Roman Peralta, P.E.
Local Programs Bridge Engineer
MS: 47390

FROM: Harvey L. Coffman, P.E., S.E. 
Bridge Preservation Engineer/Statewide Program Manager
MS: 47340

SUBJECT: Sub-delegation of Bridge Inspection Program Manager
for Local Agencies

By authority granted to me as the Statewide Program Manager, I am sub-delegating to you as the Local Programs Bridge Engineer, Program Manager duties for the federally reportable inventory of Local Agency bridges and tunnels, as defined in the National Bridge Inspection Standards (NBIS) 23 CFR 650.307(e), §650.307(c) (1), and §650.307(c) (2), and the National Tunnel Inspection Standards (NTIS) 23 CFR 650.507(g), §650.507(e) (1), §650.507(e) (2), §650.507(e) (3) for all the local agency bridge inspection programs.

These duties can be further sub-delegated by you to any local agency representative who meets the qualifications stated in §650.309(a) or §650.509(a) as appropriate. This action must be done in writing.

Please note, that the overall bridge inspection program responsibility must remain with the Bridge Preservation Engineer as the Statewide Program Manager in accordance with 23 CFR 650.307(d), and/or §650.507(f).

These qualifications need to be renewed as defined in WSBIM section 1-5.2 to maintain certification as program manager.

HLC: mms

cc: Jeff Carpenter, State Design Engineer
Mark Gaines, Bridge and Structures Engineer
George Comstock, Coding & Appraisal Engineer
Kathleen Davis, Local Programs
Debbie Lehmann, Bridge Engineer Washington Division FHWA

DOT Form 700-008 EF

2-1 General

This chapter establishes policies on how the Washington State Department of Transportation (WSDOT) and local agencies maintain bridge files, both to meet Federal Highway Administration (FHWA) requirements and effectively manage physical assets (also sometimes called physical features) on WSDOT right of way. These policies apply to structures that are generally called bridges, culverts, tunnels, lids, detention vaults, overpasses, and undercrossings when they meet certain criteria commonly based on structure geometry, location, and use described in more detail below.

These policies also apply differently depending on bridge ownership and location and fall into three main categories:

1. WSDOT-owned structures on WSDOT right of way.
2. Local agency-owned structures on WSDOT right of way.
3. Local agency-owned structures on local agency right of way.

Unless otherwise specifically noted below, all policies apply to WSDOT and local agency owned structures on WSDOT right of way. However, only those policies directly associated with FHWA requirements apply to local agency owned structures on local agency right of way. There are occasionally special circumstances in which WSDOT owns a structure on local agency right of way. This chapter has no specific policies in this case, except that the bridge file must be maintained under all circumstances.

This chapter addresses the following topics associated with bridge files:

- Maintaining physical paper and electronic bridge files.
- Maintaining a state bridge inventory.
- Submitting state bridge inventory data to FHWA.
- Responding to FHWA and Statewide Program Manager (SPM) requests for information.

Each topic has components mandated by FHWA and components required by WSDOT policy. The following sections clearly identify the authorizing environment.

2-2 Maintaining Bridge Files and Documentation

This section is largely based on requirements established by Section 2 of the *AASHTO Manual for Bridge Evaluation* (MBE) with Interim Revisions. The MBE emphasizes three main points for maintaining a bridge file:

- A. Bridge owners should maintain a complete, accurate, and current file of each bridge under their jurisdiction.
- B. A bridge file always contains the current and sometimes the cumulative information about an individual bridge.
- C. A bridge file may be stored electronically, on paper, or a mixture of both.

The remainder of this Section 2-2 describes WSDOT Bridge Preservation Office policy for maintaining bridge records.

Electronic Files

Electronic bridge files are maintained on the BEIS internal website:
<http://beist/inventoryandrepair/inventory/bridge>

This website contains the following:

1. Scanned copies of signed inspection reports in pdf format dating back to approximately the year 1998.
2. Scanned copies of the Washington State Structural Inventory and Appraisal (SIA) sheet dating back to 2011.
3. Current inspection photographs in jpg format.
4. Current and historic repair recommendations displayed directly from the BPO database (See Section 2-3), dating back to approximately the year 2002.
5. Scanned copies of contract plans, as-builts when available, otherwise award plans. Note that the plan sheets on BEIS are not the official plans, which are owned by the WSDOT regions where the bridge is located.
6. In-house repair plans dating back to 2013.
7. Scanned copies of correspondence, historic repair and maintenance reports, miscellaneous studies, and other records are scanned from the paper files and loaded onto BEIS for selected bridges. This is generally done in response to a public disclosure request or a legal discovery requirement.

Paper Files

Appendix 2-A has a plan of the WSDOT Bridge Preservation Office indicating where paper files are maintained. Paper files must be maintained on WSDOT owned or maintained structures, including:

1. All signed bridge inspection reports, including but not limited routine, fracture critical, underwater, and special report types. Original signed reports are stored in paper files and digital copies are stored electronically. Signed damage inspections in response to fires, floods, earthquakes, etc. shall also be included.
2. Any and all miscellaneous special inspections, studies, investigations, or file reviews. Examples include but are not limited to: load testing documentation, findings from FHWA technical advisory requests for information, survey results, or ground/slope stability studies.
3. A current printout of any specific inspection requirements/procedures, usually but not necessarily associated with fracture critical, underwater, or special inspection reports.
4. A stamped Load Rating Summary sheet which shows the controlling ratings shall be placed in the letter file. The original load rating calculations for state owned bridges shall be filed in the Risk Reduction section at the WSDOT Bridge Preservation Office.
5. Scour files are located in the Risk Reduction section at the WSDOT Bridge Preservation Office.
6. All current agreements with other agencies for maintenance, rehabilitation, or shared ownership.

Note: The inspection reports, miscellaneous studies and inventory data is cumulative, meaning that all historic as well as current data must be kept in the bridge file. All documents listed above, and others listed in the MBE, may be stored electronically as a supplement to the paper files. WSDOT bridge files stored electronically have a backup system intended to protect the electronic data for the life of the structures.

Other Files – Some bridge records are not available electronically at the BEIS internal website or in paper files as indicated in Appendix 2-A. The WSDOT *Bridge Design Manual* M 23-50 provides some guidance on where these records are located. The following provides some additional information:

Contract Documents – For contracts let thru WSDOT Contract Ad and Award, Washington State Archive maintains a paper cumulative file by contract number of awarded contracts and construction documents as required by the *Construction Manual* Section 10-3. WSDOT Records and Information maintains electronic copies of finalized As-Built Contract Plans.

WSDOT Bridge and Structures Office maintains structural plans and selected shop drawings which are stored electronically. Structural plans include culvert shop drawings that contain plan and design information along with plan contracts from other agencies that complete work on the WSDOT system. Shop drawings include: steel structures, expansion joints, specialized bearings (such as pot or seismic isolation bearings), prestressed girders, post-tensioned structures, and special structural designs (such as pontoon, suspension, or movable bridges).

WSDOT maintains a state Contract History database that records all contract work completed on state managed structures. This database correlates contract number and contract work to structures maintained by the WSDOT bridge inventory and starting in 2017 associates this contract work to each BMS element in each structure affected by this contract.

In-House Repair Documents – WSDOT maintains a cumulative file of all in-house repair recommendations made by the Bridge Preservation Office, and follow-up verification information when repairs are completed. If maintenance reports prepared by region maintenance crews are provided to the bridge record, they are also permanently retained. In-house drawings and specifications supplementing the repair recommendations are also retained in the electronic record starting in 2013.

Correspondence on Significant Actions or Findings – WSDOT maintains a cumulative file of correspondence (letters, emails, memos, etc.) related to significant actions or findings, including but not limited to:

- Urgent or emergency actions including posting, restricting or closing a bridge
- Critical findings, including Critical Damage Bridge Repair Reports (see WSBIM Chapter 6)
- Special reports, including deck delamination/chloride testing, settlement/ movement monitoring, and life cycle studies

This correspondence may need a “summary memo to file” after the significant actions or findings are fully addressed. This memo is intended to provide full context and the final disposition of the actions or findings for the record.

2-2.1 Transferring Bridge Ownership and/or Program Manager

Whenever a bridge transfers ownership and/or program manager responsibility, the entire bridge file, both paper and electronic, must be transferred to the new owner/program manager. Bridge transfers must be acknowledged and documented by both program managers involved along with any additional deeds, agreements, plans or other documentation available. All transfer documentation must be retained in the bridge file. See Appendix 2-B for a checklist and SPM signoff sheet. In some cases, the acknowledgement of the transfer by the program managers may be the only documentation available.

Transferring Bridge Ownership and/or Program Manager responsibilities are performed by the SPM or Local Programs DPM, but updating the electronic record in WSBIS must be performed by the Superuser account under the direct control of the SPM. This is intended to ensure that adequate documentation for these transfers are in place.

In cases where WSDOT transfers a bridge file to another agency, a complete electronic copy of the entire bridge file is made and retained permanently. Other agencies are encouraged to follow this practice, but are not required to.

2-2.2 Dead/Obsolete Bridge Files

When a bridge is demolished or permanently removed from service and no longer considered appropriate for inclusion in the bridge inventory, the program manager for the “dead” bridge shall add documented acknowledgement of the removal from the inventory into the bridge file which then must be retained for a minimum of five years. WSDOT maintains dead bridge files permanently. Local agencies are encouraged to maintain permanent dead bridge files as well, though there is no requirement to do so.

See Section 2-3.3 for more information on processing “dead” bridge electronic records in the WSBIS.

2-2.3 Structures on WSDOT Right of Way

WSDOT shall maintain a bridge file for all structures considered appropriate for inclusion in the WSBIS that are on the WSDOT right of way, including local agency bridges passing over state routes or adjacent to state routes, whether or not the structure is subject to the NBIS or reported to the NBI. For more information, see Section 2-3.4.

2-3 Maintaining a State Bridge Inventory – WSBIS

Washington State is required by 23 CFR 650.315 to maintain an inventory of all bridges (structures) subject to the National Bridge Inspection Standards (NBIS), from which selected data is reported to FHWA as requested for entry into the National Bridge Inventory (NBI). FHWA has a Stewardship Agreement with Washington State to submit NBI data on April 1 and October 1 each year.

The Moving Ahead for Progress in the 21st Century Act by the US Congress (MAP-21) has partially superseded 23 CFR Part 500, and mandates that National Bridge Elements be submitted to FHWA for all NBI bridges carrying National Highway System (NHS) routes. See www.fhwa.dot.gov/map21 for more information about MAP-21.

Federal law under 23 CFR Part 500 provides an option for state agencies to maintain a Bridge Management System (BMS), with the incentive that federal funding can be used with more flexibility. Washington State has chosen to implement a BMS and integrally incorporate it into the state inventory for bridges managed under the WSDOT bridge program. In addition, Washington State maintains an inventory to meet WAC 136-20-020, which requires that each county maintain an inventory of bridges in the state inventory. The Washington State Bridge Inventory System (WSBIS) is maintained to meet these federal and state laws and regulations. The WSBIS is also maintained to meet the WSDOT mission statement with respect to operating the state bridge structures, and provides a means for local agencies to do the same.

The WSBIS Coding Guide provides detailed instructions on how to create, update, and delete records in WSBIS, see Appendix 2-C. This coding guide is intended to define the data fields and how to edit them for use by bridge inspectors and inventory managers. This coding guide is largely based on the federal coding guide and must meet the following requirements:

1. Whenever a database field has to be translated to match the federal coding guide, this translation must be clearly defined.
2. The WSBIS coding guide cannot contradict the federal coding guide. In cases where the federal coding guide is either inconsistent with other FHWA requirements or vague, the WSBIS coding guide needs to clearly identify the issue and describe how the field should be coded into WSBIS.
3. Optional fields must be clearly identified.
4. Every field must clearly state what structure type or types it applies to, and clearly define how it should be coded for these various structure types. The current list of structure types are:
 - Structures and culverts carrying public roadways
 - Pedestrian, railroad, and other non-vehicular structures over public roadways. Private roads over public roadways are also included in this structure type.
 - Tunnels carrying public roadways within

Structures not associated with any public roadway are not specifically included in this list, but when a field must be coded for these structures the coding guide will simply state “All structure records”.

5. In cases where multiple routes interact with a structure, a “secondary” record is needed to maintain route information – usually an “undercrossing record”. Every field that must be populated for secondary records will be clearly identified.

2-3.1 WSBIS Inventory and Data

The WSBIS needs to be understood clearly in two ways – which structures are included in the inventory and what data associated with these structures is maintained. Each of these categories has both mandated and optional components.

Beginning in October 2014 there is a requirement, from MAP-21, to collect National Bridge Element data for bridges carrying NHS routes. WSDOT is meeting this mandate by requiring these bridges to have BMS elements in WSBIS, which in turn will be translated into National Bridge Elements for submittal. See Appendix 2-E for the WSDOT BMS to NBE translation specifications. See www.fhwa.dot.gov/map21 for more information about MAP-21.

2-3.1.A Mandated Bridges and Culverts in the WSBIS – Reported to the NBI

In general, a structure that is subject to the NBIS and must be reported to the NBI when it meets all of the following:

- Carries highway traffic.
- Is owned by a public agency or built on public right of way for a public agency. Bridges owned by road associations or individual property owners on private right of way do not qualify.
- Is open to the public. Bridges posted “no trespassing” or otherwise clearly identified that they are privately owned or restricted to authorized users are not considered public. Bridges behind locked gates are also not considered public.
- Has a clear span along centerline of roadway greater than 20 feet.

Utility and Detention Vaults – Based on an agreement between Washington State and FHWA, vaults under roadways are considered subject to the NBIS when the minimum clear span along the centerline of the roadway exceeds 20 feet AND is wider than 12 feet, including any structure that has any portion directly under a lane or shoulder.

There are a few special circumstances that affect whether or not a bridge is subject to the NBIS and reported to the NBI not mentioned above (see Section 2-3.5).

Structures over federal aid or STRAHNET highways must include an “under” record(s) in the WSBIS and be reported to the NBI.

2-3.1.B Mandated Tunnels in the WSBIS – Reported to the NTI

In general, a tunnel that is subject to the NTIS and must be reported to the NTI when it meets all of the following:

- Carries highway traffic inside the tunnel.
- Is owned by a public agency or built on public right of way for a public agency. Bridges owned by railroads or other owners on private right of way do not qualify. Also tunnels under public roadways that do not carry traffic inside the tunnel do not qualify.
- Is open to the public. Tunnels posted “no trespassing” or otherwise clearly identified that they are privately owned or restricted to authorized users are not considered public. Tunnels behind locked gates are also not considered public.

NBI and NTI cannot inventory the same structure twice – There are cases where a structure has features that make it possible to consider either a bridge or a tunnel. In these cases, the owning agency can make the determination, but a structure that is coded as a bridge cannot be reported to the NTI, and similarly a structure that is coded as a tunnel cannot be reported to the NBI.

2-3.1.C Optional Structures in the WSBIS – Not reported to the NBI or NTI

Optional structures include any structure that the state or local agency manages as part of their structure inventory, but which do not qualify for reporting to the NBI or NTI. Typically this will include bridges with span lengths less than 20 feet (short spans), pedestrian structures that do not cross over or under a highway, “under” records for a route that is neither federal aid nor STRAHNET, and pedestrian or railroad tunnels under public roadways.

Note: Local agency structures on WSDOT right of way have special requirements as noted in Section 2-3.4.

2-3.1.D Mandated Data in the WSBIS

All data fields defined in the FHWA Coding Guide are required in the WSBIS. In cases where structures are maintained in WSBIS but not reported to the NBI, it is still required to complete all these fields in some consistent manner defined in the coding guide.

2-3.1.E National Bridge Element (NBE) Data

All bridges subject to the NBIS and carrying NHS routes are required to include WSDOT Bridge Management System (BMS) elements and translated to National Bridge Elements and included with the annual NBI data submittal. See Appendix 2-E for detailed information on the translation process.

2-3.1.F Optional Data in the WSBIS

All other data, including BMS elements for bridges not on NHS routes, condition states, repairs, notes, and electronic photos and documents are not required in the WSBIS, and are not reported to the NBI.

2-3.2 New Bridge Inventory in the WSBIS

Newly built bridges must be added to the bridge inventory (WSBIS) and the inventory data entered within 90 days after the bridge is opened to public traffic in the anticipated final configuration as per 23 CFR 650.315(c).

New bridges to the inventory must have a unique Structure Identifier (Federal Coding Guide Item 8) in the WSBIS. In particular, when a bridge is replaced – either temporarily or permanently – with a new structure, this new structure must have a new Structure Identifier. The same Bridge Number and Bridge Name fields can be used.

Individuals who create new inventory records in the WSBIS need to be familiar with a wide variety of information sources. In preparation for creating a new inventory record, the following information should be available:

- Bridge plans
- Load rating calculations, or summary information to correctly code selected fields
- Scour calculations, or summary information to correctly code selected fields when bridge is over water
- Route information, including current State and/or Local Agency Linear Referencing System (LRS) data
- GIS location information
- Traffic information

Additional specific information may be required in many cases, including but not limited to maintenance agreements, navigable waterway permits, replacement cost estimates, and historical significance.

Individuals who create new inventory records need to coordinate closely with the inspectors who perform the initial routine/inventory inspection to ensure that all the data is collected. See Chapter 3 for inspection procedures and policies.

Temporary bridges that carry public traffic for less than 90 days or which are less than 20 feet in length do not need to be inventoried or inspected in accordance with the NBIS. In all other circumstances temporary bridges carrying public traffic must be inventoried and inspected in accordance with the NBIS, including:

- Temporary bridges installed either as an emergency response by agency staff or as a stand-alone contract without any other substantial work performed in the immediate vicinity of the bridge site.
- Temporary bridges that are an integral part of a larger construction project, located within that project, and maintained by a contractor.

2-3.3 *Deleting (Obsoleting) Bridges in the WSBIS*

WSBIS is designed to retain historical data indefinitely, including files of bridges that have been removed from service and no longer part of the current bridge inventory. These bridges are called “obsolete” in the WSBIS and are called “dead” in the paper files (see Section 2-2.2).

WSDOT policy guides the requirements for deleting (obsoleting) structures in the WSBIS, and applies to all bridges in the WSBIS.

Structure records are obsoleted by the SPM or Local Programs DPM, but updating the electronic record in WSBIS must be performed by the Superuser account under the direct control of the SPM. This is intended to ensure that adequate documentation for these obsoletions are in place. Obsoleting structure records shall include the following steps:

- Create a new informational report describing the circumstances of the removal and the replacement structure information if appropriate. This informational shall include the completed and signed Record Change Form, see Appendix 2-B.
- The informational report is signed by the Statewide Program Manager (SPM).
- The paper bridge file (record), including the last signed informational report documenting removal from the bridge inventory, shall be retained for a minimum of five years.

See Section 2-2.2 for more information on maintaining “dead” bridge files.

2-3.4 *Bridges with Multi-Agency Responsibility in the WSBIS*

There are several ways in which a single bridge can have more than one agency responsible for the bridge inventory data. This section describes four cases where the responsibility is shared between WSDOT and a local agency, and where either WSDOT or a local agency shares responsibility with another state.

2-3.4.A Shared Responsibility between WSDOT and Local Agencies

There are the four cases of shared responsibility between WSDOT and a local agency, based on the principle of assigning data responsibility to the agency in the best position to maintain and report the data. These cases are WSDOT policy for all structures on WSDOT right of way. However, they can apply equally to any two agencies (a county and a city, for example). Regardless of how local agencies address these cases, it is a requirement that all bridge data in WSBIS that is reported to the NBI must be complete, accurate and current. This WSDOT policy is superseded by any written agreement between two agencies regarding bridge inventory record keeping.

Case 1: WSDOT-Owned Bridges on WSDOT Right of Way – WSDOT will be responsible for maintaining all bridge inventory data and federal reporting in this situation.

Note: This situation applies to any combination of “on” and “under” records, route owners, and federal reporting status. However, WSDOT will ask local agencies for specific data regarding local agency route and traffic, both for routes “on” and “under” the bridge as applicable.

Case 2: Local Agency-Owned Bridges Carrying Highway Traffic Over State Routes – This situation assumes that the bridge must have a federally reported “on” record and at least one federally reported “under” record. The “on” record shall be maintained by the local agency and the “under” record(s) shall be maintained by WSDOT.

Case 3: Local Agency-Owned Pedestrian Bridges Over State Routes – This addresses all situations in which there is no federally reported “on” record, and assumes that there is a federally reported “under” record, and possibly additional “under” records for the *Bridge List M 23-09*. The “under” record(s) shall be maintained by WSDOT. If the local agency chooses to maintain a record, it cannot be federally reported.

Case 4: Local Agency-Owned Bridges on State Right of Way Adjacent to a State Route – This addresses all situations in which a local agency owns a structure (usually a pedestrian bridge) on state right of way that does not cross over or under any routes, and is deemed appropriate by WSDOT for inclusion in the bridge inventory. In this case, no records are federally reported

In all situations where there is shared responsibility between WSDOT and a local agency, the structure records in WSBIS must be shared, using the same structure identifier (Federal Coding Guide Item 8). Any situations that do not fit into these four cases listed above shall be considered on a case-by-case basis by the program managers involved and should address the following questions:

- Does the bridge record include a federally reported “on” record? These are bridges that are subject to the NBIS.
- Does the bridge record include one or more federally reported “under” records? These are bridges with federal aid or STRAHNET routes under the bridge.
- Is this a bridge that doesn’t qualify for either an “on” or “under” record? These are pedestrian or other bridges that are not subject to the NBIS, and do not cross over a highway.
- Who owns the bridge?
- What agency owns the route on the bridge, if applicable? It is relatively common for a state owned structure to carry a local agency route, usually over a state route.
- What agency owns the route (or routes) under the bridge, if applicable?
- Does either agency need to maintain “on” or “under” records that are not federally reported? WSDOT often maintains “under” records that are not reported to hold data for the *Bridge List M 23-09*.
- Are there any interagency agreements relevant to inspection and reporting responsibility?

Any interagency agreement should address these questions, and clearly assign bridge inspection and inventory responsibilities.

2-3.4.B Shared Responsibility with Other States

WSDOT shares bridge recordkeeping and FHWA reporting responsibility for all bridges that cross state lines. For all but one bridge this shared responsibility also extends to bridge ownership and maintenance. For all bridges, responsibility to perform inspections is assigned to one state agency as established by agreement.

One local agency bridge crosses the state line between Washington and Idaho. Inspection, FHWA reporting, ownership, and maintenance responsibility is established by agreement.

See Appendix 2-F for bridge specific information.

2-3.5 Reporting WSBIS Data to the NBI – Special Circumstances

Section 2-3.1 outlined requirements for bridges subject to the NBIS and reported to the NBI. However, there are several special circumstances that warrant additional discussion.

Bridges Owned by Public Agencies That Are Not Open to the Public – Public agencies can own bridges that are not part of the public right of way, intended only for access by agency staff or other authorized personnel. In general, these bridges should not be reported to the NBI, and these bridges should be signed or gated so the public either does not have access to the bridge or is clearly warned that the bridge is not part of the public way. WSDOT bridges are posted “No Trespassing” at the entrance to the bridge if they are not gated.

Bridges Owned by Public Agencies That Are Closed – Bridges that are permanently closed to highway traffic but still in place may be retained in the WSBIS, but cannot be reported to the NBI. Bridges that are closed but the agency plans to either re-open or replace with a new structure can be federally reported for up to five years.

Privately-Owned Bridges – These bridges may belong to individuals, community road associations, railroads, or corporations, and may be open to the public. One relatively common example is a bridge in a shopping mall parking lot. FHWA and WSDOT promote the incorporation of these bridges in the WSBIS and recommend they be reported to the NBI if they qualify, but there is no federal or state requirement that they be inventoried.

Public Transit Bridges – Bridges carrying public transit buses in service (carrying passengers) are subject to the NBIS, even if these bridges are restricted to only public transit vehicles. Bridges carrying light rail public transit rolling stock without any vehicular or bus traffic are not currently subject to the NBIS.

Whenever a special circumstance affects the reporting of a structure, a brief explanation of the reporting status shall be kept in the electronic bridge record for all bridges inventoried in the WSBIS.

In any situation where it is unclear if a bridge should be included in the WSBIS and reported to the NBI, please consult with the SPM.

2-3.6 Washington State Bridge List M 23-09

The WSBIS is the source of data for the *Bridge List M 23-09* published by the Bridge and Structures Office. It is a list of structures carrying or intersecting Washington State highways, and structures for which WSDOT has a maintenance responsibility. Data specific to this list is maintained for nearly all structures on WSDOT right of way, including local agency owned structures.

For more information on the data maintained for the *Bridge List M 23-09*, see the Washington State Bridge Inventory System Coding Guide in Appendix 2-C.

2-4 FHWA Data Submittal Process

The WSDOT Bridge Preservation Office extracts data from the WSBIS and submits it to FHWA for inclusion in the NBI and NBE **once** per year. Submittals may also happen at other times at the request of the Washington Division of the FHWA. The scheduled submittal **is** March 15 or the first work day following **this** date. The data submitted includes all the data defined by the NBI federal coding guide, the NBE specifications, **and the NTI specifications**, and is provided in a very specific format also defined by these documents. **This** submittal **is** performed by the Bridge Preservation Office and submitted to the FHWA User Profile and Access Control System (UPACS) under the authority of the SPM.

Data drawn for submittal to the NBI, NBE **and NTI** is taken only from the most current “released” data from WSBIS, meaning that each **structure** record has been through the quality control process described in Chapter 7, including acceptance by the BPO and LP data stewards. However, in addition to this quality control process, prior to the scheduled **FHWA** submittal both the BPO and LP data stewards run systemic checks of the data to identify and correct data errors. In particular, these checks are intended to ensure the following:

- **Structures** added to the inventory are reviewed to determine if they should be reported to **FHWA**.
- **Structures** removed from the inventory are reviewed to determine if they should be reported to **FHWA** and to ensure the electronic records accurately and sufficiently document the obsolete record.
- **Structures** that are transferred between agencies are reviewed to ensure the electronic records accurately document the transfer.
- **Structures** with shared responsibility are reviewed to ensure the electronic records are complete and accurate.

The intent is to submit error free data each submittal. In cases when errors are found but cannot be corrected because a field visit is required, the intent is that these errors will be corrected at the next regularly scheduled inspection.

Data submitted to **FHWA** is used for performance measurements after the submittal, both by FHWA and WSDOT. Verifying timely inspections for the federally reported inspection types is a primary focus of these performance measures. For the March 15 data submittal, all inspection work due through December 31 of the previous year must be “released” into WSBIS prior to March 15.

2-5 Responding to FHWA

Information Requests – FHWA requests bridge inspection information from WSDOT on a periodic basis. The information requested can be in response to national technical advisories, FHWA's oversight of the NBIS program in Washington State, or based on the WSDOT/FHWA Stewardship Agreement.

The bridge inspection requests for information from FHWA will typically be in the form of an email request with an assigned completion date based on the specific request, but can be in any format. The FHWA Division Bridge Engineer will submit the information request to the SPM. The SPM will review the FHWA information request and forward/disseminate the request to the necessary individuals for response. All information will be provided back to the SPM who will then forward the requested information to the Washington FHWA Division Bridge Engineer by the deadline in the original request.

Communication Between FHWA and WSDOT – Appendix 2-H identifies the standard communication protocol for normal operations. There is no protocol for urgent or emergency situations. The Washington SPM will be included in all written and email communications to or from FHWA regarding any bridge inspection, bridge emergency, or critical finding issues within the state of Washington. The WSDOT LP DPM and the Washington SPM will be included in all written and email communications to or from FHWA where local agency bridges are involved.

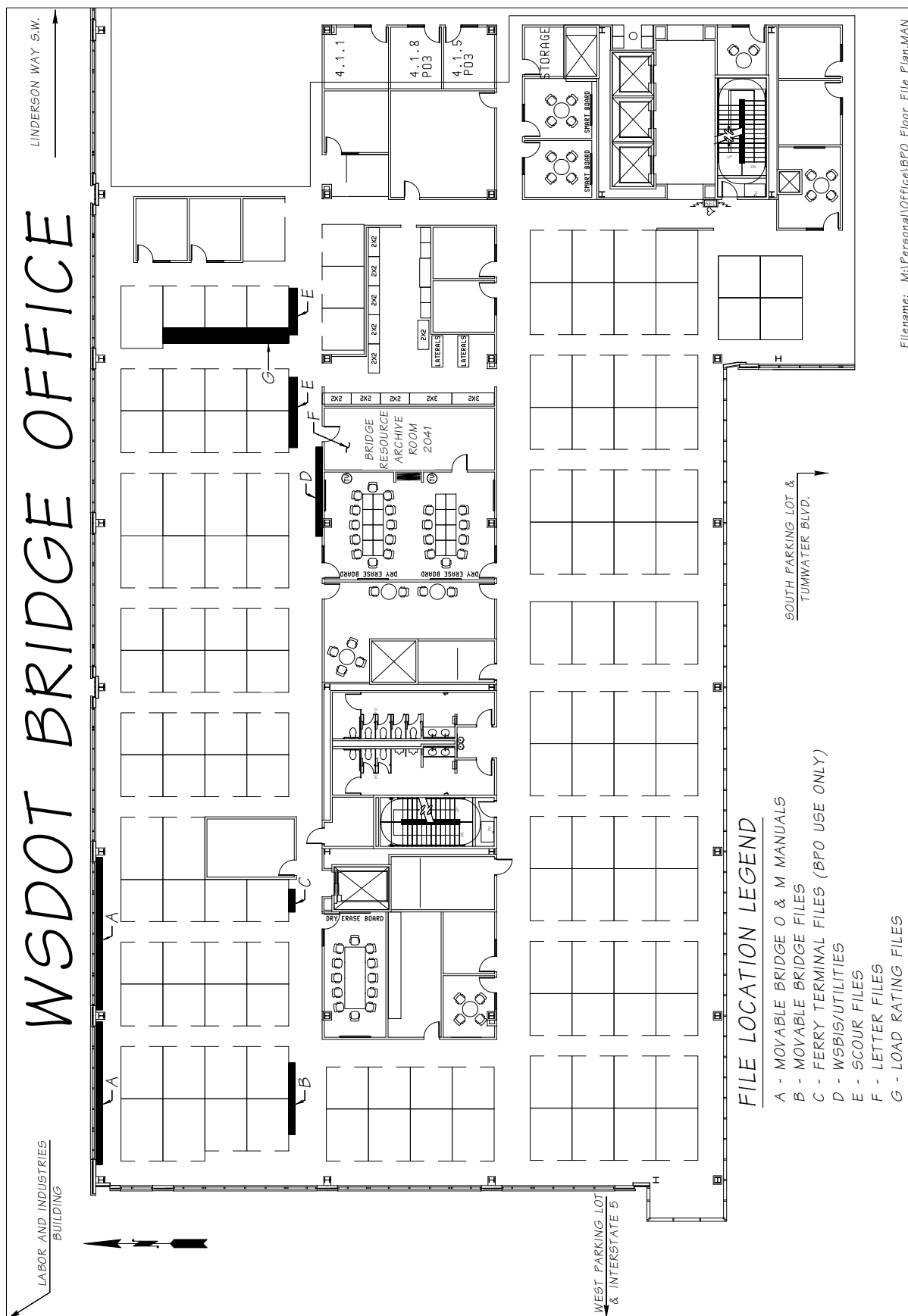
Annual NBIS Program Review – FHWA conducts an annual review of the bridge inspection organization within the state of Washington. The purpose of this review is to assure compliance with the NBIS. The review examines all facets of the inspection program – the effectiveness of the overall organization, delegated functions, inspection personnel, inspection procedures, bridge records and files, and the inventory of bridge data. It is intended to identify and correct any weaknesses while building upon existing strengths. In addition, site reviews of bridge inspections and interviews of inspection personnel are conducted. FHWA also conducts reviews of NBI data that is submitted for Washington by WSDOT.

Additional information on the NBI and NBIS can be found on the FHWA Office of Bridges and Structures website at www.fhwa.dot.gov/bridge/nbis.htm.

2-6 Appendices

Appendix 2-A	WSDOT BPO Floor Plan with File Locations
Appendix 2-B	Record Change Form
Appendix 2-C	Washington State Bridge Inventory System Coding Guide
Appendix 2-D	Vacant
Appendix 2-E	WSDOT BMS to NBE Translation
Appendix 2-F	Border Bridge Information
Appendix 2-G	Sufficiency Rating Calculation
Appendix 2-H	WSDOT/FHWA Communication Protocol Flowchart

WSDOT BPO Floor Plan with File Locations



Appendix 2-B Record Change Form



**Washington State
Department of Transportation**

Record Change Form

Record change requiring Statewide Program Manager (SPM) approval

Structure Identifier	Structure Number
Structure Name	Date of Record Change
This structure has been obsoleted <input type="checkbox"/> Yes <input type="checkbox"/> No	
If replaced with new structure, provide new structure identifier, number and name	
Is obsoleted structure demolished, moved, repurposed as pedestrian, or other? Describe	
This structure ownership has been transferred. <input type="checkbox"/> Yes <input type="checkbox"/> No	
If Yes: Transferred from _____ to _____	
If replaced with new structure, provide new structure identifier, number and name	
Agreement Number (attach signed agreement)	

Delegated Program Manager, if local agency record obsoleted

Date

Statewide Program Manager

Date

WSDOT Form 222-033 EF
Revised 10/9/2014

Appendix 2-C Washington State Bridge Inventory System Coding Guide

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1340	Structure Length	49	-	2-C-86
2346	Screening Length	-	-	2-C-89
1348	Maximum Span Length	48	-	2-C-89
1352	Lanes On	28A	-	2-C-90
1356	Curb-to-Curb Width	51	G.3	2-C-90
1360	Out-to-Out Deck Width	52	-	2-C-92
1364	Sidewalk/Curb Width Left	50A	G.4	2-C-92
1367	Sidewalk/Curb Width Right	50B	G.5	2-C-93
1310	Skew	34	-	2-C-95
1312	Flared Flag	35	-	2-C-96
1370	Minimum Vertical Clearance Over Deck	53	-	2-C-96
1374	Minimum Vertical Clearance Under Bridge	54B	-	2-C-97
1378	Vertical Underclearance Code	54A	-	2-C-99
1379	Minimum Lateral Underclearance Right	55B	-	2-C-99
1382	Lateral Underclearance Code	55A	-	2-C-102
1383	Minimum Lateral Underclearance Left	56	-	2-C-102
1386	Navigation Control	38	-	2-C-103
1387	Navigation Vertical Clearance	39	-	2-C-104
1390	Navigation Horizontal Clearance	40	-	2-C-104
1394	Vertical Lift Minimum Clearance	116	-	2-C-104
1291	Median	33	-	2-C-105
1397	Approach Roadway Width	32	-	2-C-106
2368	Minimum Vertical Clearance Over Deck Override			2-C-106
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1432	Inventory Route On/Under	5A	-	2-C-107
1433	Inventory Route Highway Class	5B	I.9	2-C-108
1434	Inventory Route Service Level	5C	-	2-C-108

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1435	Route	5D	I.7	2-C-108
2440	Milepost	-	-	2-C-109
1445	ADT	29	A.4	2-C-109
1451	ADT Truck Percentage	109	A.5	2-C-110
1453	ADT Year	30	A.6	2-C-110
1457	Future ADT	114	-	2-C-110
1463	Future ADT Year	115	-	2-C-111
1467	Linear Referencing System Route	13A	I.11	2-C-111
1469	LRS Milepost	11	I.12	2-C-112
1483	National Highway System	104	C.5	2-C-108
1484	Base Highway Network	12	-	2-C-113
1485	STRAHNET Highway	100	C.6	2-C-113
1486	Federal Lands Highways	105	-	2-C-114
1487	Functional Classification	26	C.7	2-C-115
1489	National Truck Network	110	-	2-C-116
1490	Lane Use Direction	102	C.3	2-C-116
1354	Lanes Under	28B	A.3	2-C-117
1491	Horizontal Clearance, Route Direction	47	-	2-C-117
1495	Horizontal Clearance, Reverse Direction	47	-	2-C-117
1413	Detour Length	19	A.7	2-C-119
1499	Maximum Vertical Clearance, Route Direction	10	-	2-C-120
2501	Maximum Vertical Clearance, Reverse Direction	10	-	2-C-120
2409	NTI Reportable Flag	-	-	2-C-122
2410	NBI Reportable Flag	-	-	2-C-122
7479	Federal Aid Route Number	-	-	2-C-122
7441	Speed Limit	-	-	2-C-122
Crossing Tab Supplement				
2000	Main Listing Flag	-	-	2-C-123
2401	Crossing Manager	-	-	2-C-123
2402	Crossing Description	-	-	2-C-123
2500	Minimum Vertical Clearance, Route Direction	-	-	2-C-123
2502	Minimum Vertical Clearance, Reverse Direction	-	-	2-C-123
2411	Bridge List	-	-	2-C-124
2436	Route Sequencer	-	-	2-C-124
2437	Bridge List Milepost Override	-	-	2-C-124
2438	Milepost Sequencer	-	-	2-C-124
2468	Directional Indicator	-	-	2-C-125
2470	Ahead/Back Indicator	-	-	2-C-125
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1532	Main Span Material	43A	-	2-C-127
1533	Main Span Design	43B	-	2-C-128
1535	Approach Span Material	44A	-	2-C-129
1536	Approach Span Design	44B	-	2-C-129
2537	Alphabetic Span Type	-	-	2-C-130
1538	Number of Main Spans	45	-	2-C-131

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1541	Number of Approach Spans	46	-	2-C-131
1544	Service On	42A	-	2-C-131
1545	Service Under	42B	-	2-C-132
1546	Deck type	107	-	2-C-133
1547	Wearing Surface	108A	-	2-C-134
1548	Membrane	108B	-	2-C-134
1549	Deck Protection	108C	-	2-C-135
1550	Design Load	31	-	2-C-136
1585	Border Bridge State Code	98A	-	2-C-136
1588	Border Bridge Percent	98B	-	2-C-137
1590	Border Bridge Structure Identifier	99	-	2-C-137
7565	Federal Aid Project Number	-	-	2-C-137
7557	Design Exception Date	-	-	2-C-137
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2580	Reference Inspection Date	-	-	2-C-139
2581	Load Rating Date	-	-	2-C-139
2582	Rated By	-	-	2-C-139
1551	Operating Rating Method	63	-	2-C-140
1554	Inventory Rating Method	65	L.1	2-C-140
1552	Operating Rating Tons	64	-	2-C-141
1555	Inventory Rating Tons	66	-	2-C-141
1553	Operating Rating Factor	64	L.3	2-C-141
1556	Inventory Rating Factor	66	L.2	2-C-142
2587	Type 3 Rating Factor	-	-	2-C-142
2588	Type 3S2 Rating Factor	-	-	2-C-142
2589	Type 3-3 Rating Factor	-	-	2-C-142
2590	Notional Rating Load (NRL) Rating Factor	-	-	2-C-142
2591	Single Unit 4 (SU4) Rating Factor	-	-	2-C-143
2592	Single Unit 5 (SU5) Rating Factor	-	-	2-C-143
2593	Single Unit 6 (SU6) Rating Factor	-	-	2-C-143
2594	Single Unit 7 (SU7) Rating Factor	-	-	2-C-143
2598	Emergency Vehicle 2 (EV2) Rating Factor	-	-	2-C-143
2599	Emergency Vehicle 3 (EV3) Rating Factor	-	-	2-C-143
2596	Overload 1 (OL-1) Rating Factor	-	-	2-C-144
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7832	Water Type	-	-	2-C-145
7833	Flood Plain Intrusion	-	-	2-C-145
7834	Flood Control	-	-	2-C-145
7835	Scour History	-	-	2-C-146
7836	Streambed Material Type	-	-	2-C-146
7837	Substructure Stability	-	-	2-C-146
7838	Waterway Obstruction	-	-	2-C-147
7839	Streambed Stability	-	-	2-C-147
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1844	Proposed Improvement Work Type	75A	-	2-C-150
1846	Proposed Improvement Work Method	75B	-	2-C-150
1847	Proposed Improvement Length	76	-	2-C-150
2853	Proposed Improvement Roadway Width	-	-	2-C-151
2860	Proposed Improvement Cost Per SF of Deck	-	-	2-C-151
1867	Proposed Improvement Structure Cost	94	-	2-C-151
1873	Proposed Improvement Roadway Cost	95	-	2-C-151
2870	Proposed Improvement Eng. and Misc. Cost	-	-	2-C-151
1861	Proposed Improvement Total Cost	96	-	2-C-152
1879	Proposed Improvement Estimate Year	97	-	2-C-152
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1992	Routine Inspection Target Date	-	D.1	2-C-153
1022	Urban Code	-	C.8	2-C-155
1560	Posted Load – Gross	-	L.5	2-C-157
1561	Posted Load – Axle	-	L.6	2-C-157
1562	Posted Load – Type 3	-	L.7	2-C-157
1563	Posted Load – Type 3S2	-	L.8	2-C-157
1564	Posted Load – Type 3-3	-	L.9	2-C-157
1543	Service in Tunnel	-	A.8	2-C-157
1349	Tunnel Length	-	G.1	2-C-158
1510	Number of Bores	-	S.1	2-C-158
1511	Tunnel Shape	-	S.2	2-C-159
1512	Portal Shape	-	S.3	2-C-160
1513	Ground Conditions	-	S.4	2-C-160
1514	Complex	-	S.5	2-C-161
1401	Min. Vertical Clearance Over Tunnel Roadway	-	G.2	2-C-161
1402	Tunnel Height Restriction	-	L.10	2-C-162
1408	Tunnel Hazardous Material Restriction	-	L.11	2-C-163
1409	Tunnel Other Restrictions	-	L.12	2-C-163
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1188	Latitude	Bridge ID Tab	2-C-78
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1232	Features Intersected	Bridge ID Tab	2-C-73
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1276	FIPS Code	Bridge ID Tab	2-C-79
1285	Toll	Bridge ID Tab	2-C-80
1286	Custodian	Bridge ID Tab	2-C-74
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1293	Open, Closed or Posted	NBI Tab	2-C-42
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1312	Flared Flag	Layout Tab	2-C-96
1332	Year Built	Layout Tab	2-C-85
1336	Year Rebuilt	Layout Tab	2-C-85
1340	Structure Length	Layout Tab	2-C-86
1348	Maximum Span Length	Layout Tab	2-C-89
1349	Tunnel Length	Layout Tab	2-C-158
1352	Lanes On	Layout Tab	2-C-90
1354	Lanes Under	Crossing Tab	2-C-117
1356	Curb-to-Curb Width	Layout Tab	2-C-90
1360	Out-to-Out Deck Width	Layout Tab	2-C-92
1364	Sidewalk/Curb Width Left	Layout Tab	2-C-92
1367	Sidewalk/Curb Width Right	Layout Tab	2-C-93
1370	Minimum Vertical Clearance Over Deck	Layout Tab	2-C-96
1374	Minimum Vertical Clearance Under Bridge	Layout Tab	2-C-97
1378	Vertical Underclearance Code	Layout Tab	2-C-99
1379	Minimum Lateral Underclearance Right	Layout Tab	2-C-99
1382	Lateral Underclearance Code	Layout Tab	2-C-102
1383	Minimum Lateral Underclearance Left	Layout Tab	2-C-102
1386	Navigation Control	Layout Tab	2-C-103
1387	Navigation Vertical Clearance	Layout Tab	2-C-104
1390	Navigation Horizontal Clearance	Layout Tab	2-C-104
1394	Vertical Lift Minimum Clearance	Layout Tab	2-C-104
1397	Approach Roadway Width	Layout Tab	2-C-106
1401	Min. Vertical Clearance Over Tunnel Roadway	Layout Tab	2-C-161
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Table 1 WSBIS Item Numbers by Sequence

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1409	Tunnel Other Restrictions	Layout Tab	2-C-163
1413	Detour Length	Crossing Tab	2-C-119
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1433	Inventory Route Highway Class	Crossing Tab	2-C-108
1434	Inventory Route Service Level	Crossing Tab	2-C-108
1435	Route	Crossing Tab	2-C-109
1436	Route Direction	Route Tab	2-C-165
1445	ADT	Crossing Tab	2-C-109
1451	ADT Truck Percentage	Crossing Tab	2-C-110
1453	ADT Year	Crossing Tab	2-C-110
1457	Future ADT	Crossing Tab	2-C-110
1463	Future ADT Year	Crossing Tab	2-C-111
1467	Linear Referencing System Route	Crossing Tab	2-C-111
1469	LRS Milepost	Crossing Tab	2-C-112
1483	National Highway System	Crossing Tab	2-C-112
1484	Base Highway Network	Crossing Tab	2-C-113
1485	STRAHNET Highway	Crossing Tab	2-C-113
1486	Federal Lands Highways	Crossing Tab	2-C-114
1487	Functional Classification	Crossing Tab	2-C-115
1489	National Truck Network	Crossing Tab	2-C-116
1490	Lane Use Direction	Crossing Tab	2-C-116
1491	Horizontal Clearance, Route Direction	Crossing Tab	2-C-117
1495	Horizontal Clearance, Reverse Direction	Crossing Tab	2-C-117
1499	Maximum Vertical Clearance, Route Direction	Crossing Tab	2-C-120
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1512	Portal Shape	Layout Tab	2-C-160
1513	Ground Conditions	Layout Tab	2-C-160
1514	Complex	Layout Tab	2-C-161
1532	Main Span Material	Design Tab	2-C-127
1533	Main Span Design	Design Tab	2-C-128
1535	Approach Span Material	Design Tab	2-C-129
1536	Approach Span Design	Design Tab	2-C-129
1538	Number of Main Spans	Design Tab	2-C-131
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1543	Service in Tunnel	Layout Tab	2-C-157
1544	Service On	Design Tab	2-C-131
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1546	Deck type	Design Tab	2-C-133
1547	Wearing Surface	Design Tab	2-C-134
1548	Membrane	Design Tab	2-C-134
1549	Deck Protection	Design Tab	2-C-135
1550	Design Load	Design Tab	2-C-136
1551	Operating Rating Method	Load Rating Tab	2-C-140
1552	Operating Rating Tons	Load Rating Tab	2-C-141
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1556	Inventory Rating Factor	Load Rating Tab	2-C-142
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1561	Posted Load – Axle	Load Rating Tab	2-C-157
1562	Posted Load – Type 3	Load Rating Tab	2-C-157
1563	Posted Load – Type 3S2	Load Rating Tab	2-C-157
1564	Posted Load – Type 3-3	Load Rating Tab	2-C-157
1585	Border Bridge State Code	Design Tab	2-C-136
1588	Border Bridge Percent	Design Tab	2-C-137
1590	Border Bridge Structure Identifier	Design Tab	2-C-137
1657	Structural Evaluation	NBI Tab	2-C-34
1658	Deck Geometry	NBI Tab	2-C-35
1659	Underclearances	NBI Tab	2-C-38
1660	Operating Level	NBI Tab	2-C-41
1661	Alignment	NBI Tab	2-C-39
1662	Waterway	NBI Tab	2-C-40
1663	Deck Condition	NBI Tab	2-C-45
1671	Superstructure Condition	NBI Tab	2-C-46
1676	Substructure Condition	NBI Tab	2-C-47
1677	Channel Protection Condition	NBI Tab	2-C-48
1678	Culvert Condition	NBI Tab	2-C-49
1679	Pier/Abutment Protection	NBI Tab	2-C-52
1680	Scour	NBI Tab	2-C-53
1684	Bridge Rails	NBI Tab	2-C-55
1685	Transitions	NBI Tab	2-C-57
1686	Guardrails	NBI Tab	2-C-58
1687	Terminals	NBI Tab	2-C-58
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1867	Proposed Improvement Structure Cost	Proposed Improvements Tab	2-C-151
1873	Proposed Improvement Roadway Cost	Proposed Improvements Tab	2-C-151
1879	Proposed Improvement Estimate Year	Proposed Improvements Tab	2-C-152
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2010	Bridge Sort Number	Bridge ID Tab	2-C-72
2023	City	Bridge ID Tab	2-C-77
2181	Section	Bridge ID Tab	2-C-79
2183	Township	Bridge ID Tab	2-C-79
2185	Range	Bridge ID Tab	2-C-79
2295	Historical Significance - HAER	Bridge ID Tab	2-C-82
2346	Screening Length	Layout Tab	2-C-82
2368	Minimum Vertical Clearance Over Deck Override	Layout Tab	2-C-106
2400	Program Manager	Bridge ID Tab	2-C-74
2401	Crossing Manager	Crossing Tab Supplement	2-C-123
2402	Crossing Description	Crossing Tab Supplement	2-C-123
2409	NTI Reportable Flag	Crossing Tab	2-C-122
2410	NBI Reportable Flag	Crossing Tab	2-C-122
2411	Bridge List	Crossing Tab Supplement	2-C-124
2436	Route Sequencer	Crossing Tab Supplement	2-C-124
2437	Bridge List Milepost Override	Crossing Tab Supplement	2-C-124
2438	Milepost Sequencer	Crossing Tab Supplement	2-C-124
2440	Milepost	Crossing Tab	2-C-109
2468	Directional Indicator	Crossing Tab Supplement	2-C-125
2470	Ahead/Back Indicator	Crossing Tab Supplement	2-C-125
2500	Minimum Vertical Clearance, Route Direction	Crossing Tab Supplement	2-C-123
2501	Maximum Vertical Clearance, Reverse Direction	Crossing Tab	2-C-120
2502	Minimum Vertical Clearance, Reverse Direction	Crossing Tab Supplement	2-C-123
2537	Alphabetic Span Type	Design Tab	2-C-130
2580	Reference Inspection Date	Load Rating Tab	2-C-139
2581	Load Rating Date	Load Rating Tab	2-C-139
2582	Rated By	Load Rating Tab	2-C-139
2587	Type 3 Rating Factor	Load Rating Tab	2-C-142
2588	Type 3S2 Rating Factor	Load Rating Tab	2-C-142
2589	Type 3-3 Rating Factor	Load Rating Tab	2-C-142
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Table 1 WSBIS Item Numbers by Sequence

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2592	Single Unit 5 (SU5) Rating Factor	Load Rating Tab	2-C-143
2593	Single Unit 6 (SU6) Rating Factor	Load Rating Tab	2-C-143
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2596	Overload 1 (OL-1) Rating Factor	Load Rating Tab	2-C-144
2597	Overload 2 (OL-2) Rating Factor	Load Rating Tab	2-C-144
2598	Emergency Vehicle 2 (EV2) Rating Factor	Load Rating Tab	2-C-143
2599	Emergency Vehicle 3 (EV3) Rating Factor	Load Rating Tab	2-C-143
2610	Asphalt Depth	NBI Tab	2-C-59
2611	Design Curb Height	NBI Tab	2-C-59
2612	Bridge Rail Height	NBI Tab	2-C-59
2613	Risk Category	NBI Tab	2-C-43
2614	Subject to NBIS Flag	NBI Tab	2-C-60
2615	Special Structures Flag	Bridge ID Tab	2-C-83
2642	Inspection Hours	Report Tab	2-C-31
2643	Inspection Overtime Hours	Report Tab	2-C-31
2646	Inspector Initials	Report Tab	2-C-31
2649	Inspector Certification Number	Report Tab	2-C-31
2654	Co-Inspector Initials	Report Tab	2-C-31
2675	Number of Utilities	NBI Tab	2-C-59
2688	Revise Rating Flag	NBI Tab	2-C-61
2691	Photos Flag	NBI Tab	2-C-61
2693	Soundings Flag	NBI Tab	2-C-61
2694	Clearance Flag	NBI Tab	2-C-62
2695	QA Flag	NBI Tab	2-C-62
2853	Proposed Improvement Roadway Width	Proposed Improvements Tab	2-C-151
2860	Proposed Improvement Cost Per SF of Deck	Proposed Improvements Tab	2-C-151
2870	Proposed Improvement Eng. and Misc. Cost	Proposed Improvements Tab	2-C-151
2883	Proposed Improvement Calculation	Proposed Improvements Tab	2-C-149
2900	Late Inspection Explanation	Report Tab	2-C-32
2901	Program Manager Response Date	Report Tab	2-C-32
2902	Program Manager Approval	Report Tab	2-C-32
2920	Report Type	Report Tab	2-C-25
2921	Inspection Type	Report Tab	2-C-25
2922	Inspection Due Date	Report Tab	2-C-30
2923	Inspection Due Date Override	Report Tab	2-C-30
2924	Report Type Notes	Report Tab	2-C-30
2930	Obsolete Structure Flag	Bridge ID Tab	2-C-83
7281	Legislative District 1	Bridge ID Tab	2-C-83
7283	Legislative District 2	Bridge ID Tab	2-C-83
7296	Historical Significance - Local	Bridge ID Tab	2-C-83
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Table 1 WSBIS Item Numbers by Sequence

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7664	Drain Condition	NBI Tab	2-C-63
7665	Drain Status	NBI Tab	2-C-63
7666	Deck Scaling	NBI Tab	2-C-64
7667	Deck Scaling Percent	NBI Tab	2-C-64
7669	Deck Rutting	NBI Tab	2-C-64
7670	Deck Exposed Rebar	NBI Tab	2-C-65
7672	Curb Condition	NBI Tab	2-C-65
7673	Sidewalk Condition	NBI Tab	2-C-66
7674	Paint Condition	NBI Tab	2-C-66
7681	Approach Condition	NBI Tab	2-C-67
7682	Retaining Wall Condition	NBI Tab	2-C-67
7683	Pier Protection Condition	NBI Tab	2-C-68
7710	Sufficiency Rating	NBI Tab	2-C-68
7711	Structurally Deficient/Functionally Obsolete	NBI Tab	2-C-69
7832	Water Type	Waterway Tab	2-C-145
7833	Flood Plain Intrusion	Waterway Tab	2-C-145
7834	Flood Control	Waterway Tab	2-C-145
7835	Scour History	Waterway Tab	2-C-146
7836	Streambed Material Type	Waterway Tab	2-C-146
7837	Substructure Stability	Waterway Tab	2-C-146
7838	Waterway Obstruction	Waterway Tab	2-C-147
7839	Streambed Stability	Waterway Tab	2-C-147
7840	Streambed Anabranch	Waterway Tab	2-C-147
7841	Piers in Water	Waterway Tab	2-C-148

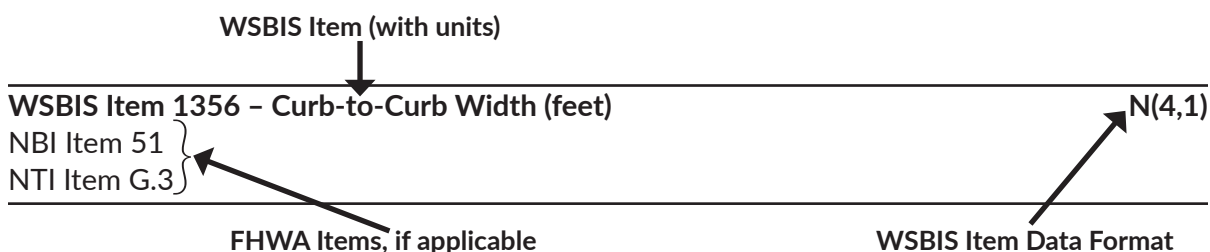
Coding Guide Instructions

This coding guide is intended as a companion to the BridgeWorks application, and provides more detailed definitions for many of the data entry fields visible in BridgeWorks. Those fields defined herein have the associated 4 digit WSBIS Item Number in blue parentheses next to the data entry field. BridgeWorks users who need more information about how to code a field should click on these item numbers, which will take them to the relevant section in this coding guide.

This coding guide also identifies data fields that are reported to the NBI and/or NTI. Some WSBIS field definitions vary from the NBI or NTI, and are automatically translated when submitted to FHWA. This coding guide identifies all translated fields. In some cases, NBI field definitions have been updated by memorandum or are subject to interpretation. These issues are addressed in the NBI Commentary subsection of each field definition when they occur.

I. Item Format

Each field defined herein has a standard header:



The **WSBIS Item (with units)** includes the 4 digit item number and item name. In some cases units are not applicable, and therefore not shown. The leading digit of the item numbers has the following significance:

- 1xxx item numbers are reported to the FHWA, either to the NBI, NTI, or both.
- 2xxx item numbers are not reported to the FHWA and are maintained by WSDOT Bridge Preservation Office.
- 7xxx item numbers are not reported to the FHWA and are maintained by WSDOT Local Programs.

The **FHWA Items, if applicable**, identify the equivalent FHWA items in the Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges (aka the NBI coding guide) or the Specifications for the National Tunnel Inventory (aka the NTI coding guide).

The **WSBIS Item Data Format** describes the data type and size limitations for data entry into BridgeWorks, using the following codes:

N(x,y)	Numeric, with x identifying the total number of characters and y identifying the number of decimal places. This data format requires a decimal place and only allows numbers. For example N(4,1) would allow a number of 432.1 though 32.1 or 2.0 would also be allowed.
AN(x)	Alphanumeric, with x identifying the total number of characters. This data format allows virtually any character to be placed in this field, either letters, numbers, dashes, spaces, etc.
Pulldown	Populated by using a pulldown menu of pre-selected options.
Date	Populated with a pop-up calendar or user data entry in mm/dd/yyyy format

- Check Box Clicking on the box adds a check mark, activating feature in BridgeWorks
- Calculated A calculated field, no direct data entry by user.
- Integer These fields are populated only by whole numbers, no decimals allowed.

II. On, Under, and “Neither On or Under” Records

On and Under records define how a structure relates to public roadways, signifying routes On and routes Under a structure. Note that when a single structure carries a public roadway and has a public roadway crossing under it, it should have both an On and Under record. In cases where multiple roadways cross under a structure, it may have multiple Under records, each carrying data specific to that route.

“Neither On or Under” records are used when the structure has no relationship to a public roadway.

Examples:

Bridge 90/327 Schoessler Rd Over I-90 – This bridge has an On crossing record for Schoessler Rd and an Under crossing record for I-90.

Bridge 90/531N I-90 Over Garden Springs Rd – This bridge has an On crossing record for I-90 and an Under crossing record for Garden Springs Road.

Bridge 90/564P Pedestrian Br Over I-90 – This bridge has an Under crossing record for I-90 and no On record, since the bridge doesn’t carry a public roadway.

Bridge 90/179.25 Schnebly Coulee – This bridge has an On crossing record for I-90 and no Under record, since the bridge doesn’t have a public roadway crossing under it. **Bridge 90/43P Mercer Slough Pedestrian Bridge** – This is a “Neither On or Under record” since it doesn’t carry a public roadway on or under it.

Tunnel 90/55 SE 35th St Tunnel Under I-90 – Tunnels are coded as Under records, and only carry route information for the route inside the tunnel. As of 2018, WSBIS doesn’t maintain data for routes on top of tunnels.

Pedestrian and railroad bridges over routes carrying public roadways are inventoried in WSBIS primarily to manage restrictions to roadway traffic imposed by these structures. WSBIS maintains less data for these structures, as compared to bridges carrying public roadways themselves. Table 2 provides a listing of the WSBIS fields maintained for these structures.

Table 2 WSBIS Items Coded for Pedestrian, Railroad, and other non-vehicular bridges over public roadways¹

WSBIS Item No.	WSBIS Item Name	NBI Item No.	Page No.
Report Tab			
2920	Report Type	-	2-C-25
1991	Routine Inspection Frequency	91	
1991	Fracture Critical Inspection Frequency	92A	
1991	Underwater Inspection Frequency	92B	
1991	Special Feature Inspection Frequency	92C	
1990	Routine Inspection Date	90	
1990	Fracture Critical Inspection Date	93A	
1990	Underwater Inspection Date	93B	

Table 2 WSBIS Items Coded for Pedestrian, Railroad, and other non-vehicular bridges over public roadways¹

WSBIS Item No.	WSBIS Item Name	NBI Item No.	Page No.
1990	Special Feature Inspection Date	93C	
2922	Inspection Due Date	-	2-C-30
2923	Inspection Due Date Override	-	2-C-30
2924	Report Type Notes	-	2-C-30
2921	Inspection Type	-	2-C-25
2646	Inspector Initials	-	2-C-31
2649	Inspector Certification Number	-	2-C-31
2654	Co-Inspector Initials	-	2-C-31
2642	Inspection Hours	-	2-C-31
2643	Inspection Overtime Hours	-	2-C-31
7644	Inspection Report Hours	-	2-C-32
2900	Late Inspection Explanation	-	2-C-32
2901	Program Manager Response Date	-	2-C-32
2902	Program Manager Approval	-	2-C-32
NBI Tab			
Adequacy Appraisals			
2613	Risk Category	-	2-C-43
Condition Codes²			
1663	Deck Condition	58	2-C-45
1671	Superstructure Condition	59	2-C-46
1676	Substructure Condition	60	2-C-47
1677	Channel Protection Condition	61	2-C-48
1678	Culvert Condition	62	2-C-49
Miscellaneous Fields			
2614	Subject to NBIS Flag	-	2-C-60
Inspection Flags			
2691	Photos Flag	-	2-C-61
2694	Clearance Flag	-	2-C-62
2695	QA Flag	-	2-C-62
Bridge ID Tab			
1001	Structure Identifier	8	2-C-71
2009	Bridge Number	-	2-C-71
2010	Bridge Sort Number	-	2-C-59
1132	Structure Name	-	2-C-73
1232	Features Intersected	6	2-C-73
1256	Facilities Carried	7	2-C-73
1156	Location (Main Listings)	9	2-C-74
2400	Program Manager	-	2-C-74
1286	Custodian	21	2-C-74
1019	Owner	22	2-C-74
1021	County Code	3	2-C-76
2023	City	-	2-C-77
1274	Region code	2	2-C-77
1188	Latitude	16	2-C-78
1196	Longitude	17	2-C-78

Table 2 WSBIS Items Coded for Pedestrian, Railroad, and other non-vehicular bridges over public roadways¹

WSBIS Item No.	WSBIS Item Name	NBI Item No.	Page No.
2181	Section	-	2-C-79
2183	Township	-	2-C-79
2185	Range	-	2-C-79
1276	FIPS Code	4	2-C-79
1285	Toll	20	2-C-80
1288	Parallel Structure	101	2-C-80
1289	Temporary Structure	103	2-C-81
1292	Historical Significance - NRHP	37	2-C-82
2295	Historical Significance - HAER	-	2-C-82
7296	Historical Significance - Local	-	2-C-83
7281	Legislative District 1	-	2-C-83
7283	Legislative District 2	-	2-C-83
2615	Special Structures Flag	-	2-C-83
2930	Obsolete Structure Flag	-	2-C-83
Layout Tab			
1332	Year Built	27	2-C-85
1336	Year Rebuilt	106	2-C-85
1340	Structure Length	49	2-C-86
1348	Maximum Span Length	48	2-C-89
1352	Lanes On	28A	2-C-90
1374	Minimum Vertical Clearance Under Bridge	54B	2-C-97
1378	Vertical Underclearance Code	54A	2-C-99
1379	Minimum Lateral Underclearance Right	55B	2-C-99
1382	Lateral Underclearance Code	55A	2-C-102
1383	Minimum Lateral Underclearance Left	56	2-C-102
1386	Navigation Control	38	2-C-103
1387	Navigation Vertical Clearance	39	2-C-104
1390	Navigation Horizontal Clearance	40	2-C-104
Crossing Tab			
1432	Inventory Route On/Under	5A	2-C-107
1433	Inventory Route Highway Class	5B	2-C-108
1434	Inventory Route Service Level	5C	2-C-108
1435	Route	5D	2-C-109
2440	Milepost	-	2-C-109
1445	ADT	29	2-C-109
1451	ADT Truck Percentage	109	2-C-110
1453	ADT Year	30	2-C-110
1457	Future ADT	114	2-C-110
1463	Future ADT Year	115	2-C-111
1467	Linear Referencing System Route	13A	2-C-111
1469	LRS Milepost	11	2-C-112
1483	National Highway System	104	2-C-112
1484	Base Highway Network	12	2-C-113
1485	STRAHNET Highway	100	2-C-113

Table 2 WSBIS Items Coded for Pedestrian, Railroad, and other non-vehicular bridges over public roadways¹

WSBIS Item No.	WSBIS Item Name	NBI Item No.	Page No.
1486	Federal Lands Highways	105	2-C-114
1487	Functional Classification	26	2-C-115
1489	National Truck Network	110	2-C-116
1490	Lane Use Direction	102	2-C-116
1354	Lanes Under	28B	2-C-117
1491	Horizontal Clearance, Route Direction	47	2-C-117
1495	Horizontal Clearance, Reverse Direction	47	2-C-117
1413	Detour Length	19	2-C-119
1499	Maximum Vertical Clearance, Route Direction	10	2-C-120
2501	Maximum Vertical Clearance, Reverse Direction	10	2-C-120
2409	NTI Reportable Flag	-	2-C-122
2410	NBI Reportable Flag	-	2-C-122
7479	Federal Aid Route Number	-	2-C-122
7441	Speed Limit	-	2-C-122
Crossing Tab Supplement			
2000	Main Listing Flag	-	2-C-123
2401	Crossing Manager	-	2-C-123
2402	Crossing Description	-	2-C-123
2500	Minimum Vertical Clearance, Route Direction	-	2-C-123
2502	Minimum Vertical Clearance, Reverse Direction	-	2-C-123
2411	Bridge List	-	2-C-124
2436	Route Sequencer	-	2-C-124
2437	Bridge List Milepost Override	-	2-C-124
2438	Milepost Sequencer	-	2-C-124
2468	Directional Indicator	-	2-C-125
2470	Ahead/Back Indicator	-	2-C-125
Design Tab			
1532	Main Span Material	43A	2-C-127
1533	Main Span Design	43B	2-C-128
1535	Approach Span Material	44A	2-C-129
1536	Approach Span Design	44B	2-C-129
2537	Alphabetic Span Type	-	2-C-130
1544	Service On	42A	2-C-131
1545	Service Under	42B	2-C-132
1546	Deck type	107	2-C-133
1547	Wearing Surface	108A	2-C-134
1548	Membrane	108B	2-C-134
1549	Deck Protection	108C	2-C-135

Notes:

1. These structures are always associated with a Condition and/or Primary Safety Inspection report type.
2. Condition codes used only when Condition report type is used.

Tunnels are coded as Under records. Table 3 identifies the fields coded for tunnels, noting that all route information applies to the route inside the tunnel.

Table 3 WSBIS Items Coded for Tunnels

WSBIS Item No.	WSBIS Item Name	NTI Item No.	WSBIS Application Tab	Page No.
Report Tab				
2920	Report Type	-	Report Tab	2-C-25
1991	Routine Inspection Frequency	D.3	Report Tab	
1991	Fracture Critical Inspection Frequency	-	Report Tab	
1991	Underwater Inspection Frequency	-	Report Tab	
1991	Special Feature Inspection Frequency	-	Report Tab	
1990	Routine Inspection Date	D.2	Report Tab	
1990	Fracture Critical Inspection Date	-	Report Tab	
1990	Underwater Inspection Date	-	Report Tab	
1990	Special Feature Inspection Date	-	Report Tab	
2922	Inspection Due Date	-	Report Tab	2-C-30
2923	Inspection Due Date Override	-	Report Tab	2-C-30
2924	Report Type Notes	-	Report Tab	2-C-30
2921	Inspection Type	-	Report Tab	2-C-25
2646	Inspector Initials	-	Report Tab	2-C-31
2649	Inspector Certification Number	-	Report Tab	2-C-31
2654	Co-Inspector Initials	-	Report Tab	2-C-31
2642	Inspection Hours	-	Report Tab	2-C-31
2643	Inspection Overtime Hours	-	Report Tab	2-C-31
7644	Inspection Report Hours	-	Report Tab	2-C-32
2900	Late Inspection Explanation	-	Report Tab	2-C-32
2901	Program Manager Response Date	-	Report Tab	2-C-32
2902	Program Manager Approval	-	Report Tab	2-C-32
NBI Tab (NTI Tab in WSBIS Application)				
Adequacy Appraisals				
1293	Open, Closed or Posted	L.4	Load Rating Tab	2-C-42
2613	Risk Category	-	NTI Tab	2-C-43
Miscellaneous Fields				
2614	Subject to NBIS Flag	-	NTI Tab	2-C-60
Inspection Flags				
2688	Revise Rating Flag	-	NTI Tab	2-C-61
2691	Photos Flag	-	NTI Tab	2-C-61
2694	Clearance Flag	-	NTI Tab	2-C-62
2695	QA Flag	-	NTI Tab	2-C-62
Bridge ID Tab (Tunnel ID Tab in WSBIS Application)				
1001	Structure Identifier	I.1	Tunnel ID Tab	2-C-71
2009	Bridge Number	-	Tunnel ID Tab	2-C-71
2010	Bridge Sort Number	-	Tunnel ID Tab	2-C-72
1132	Structure Name	I.2	Tunnel ID Tab	2-C-73
1232	Features Intersected	-	Tunnel ID Tab	2-C-73
1256	Facilities Carried	I.10	Tunnel ID Tab	2-C-73
1156	Location (Main Listings)	-	Tunnel ID Tab	2-C-74
2400	Program Manager	-	Tunnel ID Tab	2-C-74
1286	Custodian	C.2	Tunnel ID Tab	2-C-74

Table 3 WSBIS Items Coded for Tunnels

WSBIS Item No.	WSBIS Item Name	NTI Item No.	WSBIS Application Tab	Page No.
1019	Owner	C.1	Tunnel ID Tab	2-C-74
1021	County Code	I.4	Tunnel ID Tab	2-C-76
2023	City	-	Tunnel ID Tab	2-C-77
1274	Region code	I.6	Tunnel ID Tab	2-C-77
1188	Latitude	I.13	Tunnel ID Tab	2-C-78
1196	Longitude	I.14	Tunnel ID Tab	2-C-78
2181	Section	-	Tunnel ID Tab	2-C-79
2183	Township	-	Tunnel ID Tab	2-C-79
2185	Range	-	Tunnel ID Tab	2-C-79
1276	FIPS Code	I.5	Tunnel ID Tab	2-C-79
1285	Toll	C.4	Tunnel ID Tab	2-C-80
1292	Historical Significance - NRHP	-	Tunnel ID Tab	2-C-82
2295	Historical Significance - HAER	-	Tunnel ID Tab	2-C-82
7296	Historical Significance - Local	-	Tunnel ID Tab	2-C-82
7281	Legislative District 1	-	Tunnel ID Tab	2-C-83
7283	Legislative District 2	-	Tunnel ID Tab	2-C-83
2615	Special Structures Flag	-	Tunnel ID Tab	2-C-83
2930	Obsolete Structure Flag	-	Tunnel ID Tab	2-C-83
Layout Tab				
1332	Year Built	A.1	Layout Tab	2-C-85
1336	Year Rebuilt	A.2	Layout Tab	2-C-85
1340	Structure Length	-	Layout Tab	2-C-86
1356	Curb-to-Curb Width	G.3	Layout Tab	2-C-90
1364	Sidewalk/Curb Width Left	G.4	Layout Tab	2-C-92
1367	Sidewalk/Curb Width Right	G.5	Layout Tab	2-C-93
Crossing Tab (Route Tab in WSBIS Application)				
1432	Inventory Route On/Under	-	Route Tab	2-C-107
1433	Inventory Route Highway Class	I.9	Route Tab	2-C-108
1434	Inventory Route Service Level	-	Route Tab	2-C-108
1435	Route	I.7	Route Tab	2-C-109
2440	Milepost	-	Route Tab	2-C-109
1445	ADT	A.4	Route Tab	2-C-109
1451	ADT Truck Percentage	A.5	Route Tab	2-C-110
1453	ADT Year	A.6	Route Tab	2-C-110
1457	Future ADT	-	Route Tab	2-C-110
1463	Future ADT Year	-	Route Tab	2-C-111
1467	Linear Referencing System Route	I.11	Route Tab	2-C-111
1469	LRS Milepost	I.12	Route Tab	2-C-112
1483	National Highway System	C.5	Route Tab	2-C-112
1484	Base Highway Network	-	Route Tab	2-C-113
1485	STRAHNET Highway	C.6	Route Tab	2-C-113
1486	Federal Lands Highways	-	Route Tab	2-C-114
1487	Functional Classification	C.7	Route Tab	2-C-115
1489	National Truck Network	-	Route Tab	2-C-116
1490	Lane Use Direction	C.3	Route Tab	2-C-116
1354	Lanes Under	A.3	Route Tab	2-C-117

Table 3 WSBIS Items Coded for Tunnels

WSBIS Item No.	WSBIS Item Name	NTI Item No.	WSBIS Application Tab	Page No.
1491	Horizontal Clearance, Route Direction	-	Crossing Tab (INV)	2-C-117
1495	Horizontal Clearance, Reverse Direction	-	Crossing Tab (INV)	2-C-117
1413	Detour Length	A.7	Route Tab	2-C-119
1499	Maximum Vertical Clearance, Route Direction	-	Crossing Tab (INV)	2-C-120
2501	Maximum Vertical Clearance, Reverse Direction	-	Crossing Tab (INV)	2-C-120
2409	NTI Reportable Flag	-	Route Tab	2-C-122
2410	NBI Reportable Flag	-	Route Tab	2-C-122
7479	Federal Aid Route Number	-	Route Tab	2-C-122
7441	Speed Limit	-	Route Tab	2-C-122
Crossing Tab Supplement				
2000	Main Listing Flag	-	Crossing Tab (INV)	2-C-123
2401	Crossing Manager	-	Crossing Tab (INV)	2-C-123
2402	Crossing Description	-	Crossing Tab (INV)	2-C-123
2500	Minimum Vertical Clearance, Route Direction	-	Crossing Tab (INV)	2-C-123
2502	Minimum Vertical Clearance, Reverse Direction	-	Crossing Tab (INV)	2-C-123
2411	Bridge List	-	Crossing Tab (INV)	2-C-124
2436	Route Sequencer	-	Crossing Tab (INV)	2-C-124
2437	Bridge List Milepost Override	-	Crossing Tab (INV)	2-C-124
2438	Milepost Sequencer	-	Crossing Tab (INV)	2-C-124
2468	Directional Indicator	-	Crossing Tab (INV)	2-C-125
2470	Ahead/Back Indicator	-	Crossing Tab (INV)	2-C-125
Design Tab				
2537	Alphabetic Span Type	-	Layout Tab	2-C-130
Load Rating Tab				
2580	Reference Inspection Date	-	Load Rating Tab	2-C-139
2581	Load Rating Date	-	Load Rating Tab	2-C-139
2582	Rated By	-	Load Rating Tab	2-C-139
1551	Operating Rating Method	-	Load Rating Tab	2-C-140
1554	Inventory Rating Method	L.1	Load Rating Tab	2-C-140
1553	Operating Rating Factor	L.3	Load Rating Tab	2-C-142
1556	Inventory Rating Factor	L.2	Load Rating Tab	2-C-142
2587	Type 3 Rating Factor	-	Load Rating Tab	2-C-142

Table 3 WSBIS Items Coded for Tunnels

WSBIS Item No.	WSBIS Item Name	NTI Item No.	WSBIS Application Tab	Page No.
2588	Type 3S2 Rating Factor	-	Load Rating Tab	2-C-142
2589	Type 3-3 Rating Factor	-	Load Rating Tab	2-C-142
2590	Notional Rating Load (NRL) Rating Factor	-	Load Rating Tab	2-C-142
2591	Single Unit 4 (SU4) Rating Factor	-	Load Rating Tab	2-C-143
2592	Single Unit 5 (SU5) Rating Factor	-	Load Rating Tab	2-C-143
2593	Single Unit 6 (SU6) Rating Factor	-	Load Rating Tab	2-C-143
2594	Single Unit 7 (SU7) Rating Factor	-	Load Rating Tab	2-C-143
2598	Emergency Vehicle 2 (EV2) Rating Factor	-	Load Rating Tab	2-C-143
2599	Emergency Vehicle 3 (EV3) Rating Factor	-	Load Rating Tab	2-C-143
2596	Overload 1 (OL-1) Rating Factor	-	Load Rating Tab	2-C-144
2597	Overload 2 (OL-2) Rating Factor	-	Load Rating Tab	2-C-144
Tunnel Supplement Tab				
1992	Routine Inspection Target Date	D.1	Report Tab	2-C-153
1022	Urban Code	C.8	Tunnel ID Tab	2-C-155
1560	Posted Load – Gross	L.5	Load Rating Tab	2-C-157
1561	Posted Load – Axle	L.6	Load Rating Tab	2-C-157
1562	Posted Load – Type 3	L.7	Load Rating Tab	2-C-158
1563	Posted Load – Type 3S2	L.8	Load Rating Tab	2-C-157
1564	Posted Load – Type 3-3	L.9	Load Rating Tab	2-C-157
1543	Service in Tunnel	A.8	Layout Tab	2-C-157
1349	Tunnel Length	G.1	Layout Tab	2-C-158
1510	Number of Bores	S.1	Layout Tab	2-C-158
1511	Tunnel Shape	S.2	Layout Tab	2-C-159
1512	Portal Shape	S.3	Layout Tab	2-C-160
1513	Ground Conditions	S.4	Layout Tab	2-C-160
1514	Complex	S.5	Layout Tab	2-C-161
1401	Min. Vertical Clearance Over Tunnel Roadway	G.2	Layout Tab	2-C-161
1402	Tunnel Height Restriction	L.10	Layout Tab	2-C-162
1408	Tunnel Hazardous Material Restriction	L.11	Layout Tab	2-C-162
1409	Tunnel Other Restrictions	L.12	Layout Tab	2-C-163
1436	Route Direction	I.8	Route Tab	2-C-165

III. Establishing/Reestablishing the Inventory Record

The original inventory record needs to be established only once and is required when:

- A new bridge has been built (usually before it is placed in service).
- An existing bridge has been replaced with a new bridge (**it is required that the existing record and its' SID be deleted before a new record for the bridge is established with a new unique SID**).
- A detour bridge has been built and remains in service for more than three years or beyond the life of the contract under which it was built.
- An existing bridge not previously inventoried is added to the statewide inventory.

A bridge's original inventory record can be established by the following steps.

1. In BridgeWorks, select "Create Structure" from the Operation tab at the top of the main page. A new window will pop up with ten data entry fields. Two of these fields are automatically filled in by the BridgeWorks application. First, the Provisional (or temporary) SID will be assigned. Second, the "Sort Bridge Number" will be created when you fill the "Bridge Number" field. The last two digits of the Provisional SID are for sequencing the creation of multiple new records (i.e., "01", "02"). The permanent SID is assigned by WSDOT when the new record is released to the WSBS. Enter valid data in all of the other fields.

After completing all fields, click "Create Structure" button to close the window and add the new record to your inventory list. You can then choose the new record off the bridge list and continue adding the required inventory information.

2. Enter appropriate values in the data entry fields on the application forms (tabs).
3. A copy of this Inventory Report shall be kept in the bridge file.

IV. Reestablishing the Inventory Record

If an Inventory record for a bridge has been mistakenly deleted or obsoleted (as sometimes happens when a bridge has changed ownership), it can be recovered by emailing a request to the Local Agency Bridge Inventory Engineer for local agency bridges or to the BPO Bridge Inventory Engineer for State owned bridges. In the request, be sure to provide correct control field information.

Once the record has been recovered, it must be reviewed for errors and corrected. Submit the updated data in the manner described for updating the inventory.

V. Updating the Inventory

The original bridge inventory record needs to be updated whenever new data must be added or whenever changes must be made to the existing record.

Updates to the original inventory data may be required as a result of damage to the bridge, changed conditions noted during an inspection, safety improvements or rehabilitation, when new computations or measurements are made, or when the bridge changes ownership. Updates to a bridges' inventory record must be reported to the Local Agency Bridge Inventory Engineer or the BPO Bridge Inventory Engineer within 90 days. Updates that have not been Released to the bridge inventory will not be included in any submittals and reports prepared using that data.

To start the update process, select the bridge record from the Bridge List you want to change. Be sure the latest Master Control Data (MCD) in the Control Data Grid is highlighted and then click "Edit Control Data" from the Control Data to create an updatable copy. This new copy will be in a state of "Work" and is called an Update Control Data (UCD). To complete an update, this procedure will be followed.

1. Review the data displayed in the BridgeWorks forms (tabs). All of the forms except BMS, Notes, Repairs, Photos, Files, and Letters are arranged with two data fields after the field name. The left side data field will display existing information. The right side data field is for entering update information.
2. Enter new coding values in each Data Entry Field that must be updated. Make sure your entry is complete. Choosing F9 from your keyboard or clicking the Inspector Data Check" button on the Control Data tab will cause BridgeWorks to run the error

checking process for the selected Control Data (CD). BridgeWorks will then provide you with a list of errors or will let you know that no errors were found. This process can be run on UCD's or MCD's.

- If you are entering new data, simply enter the appropriate values in the field.
 - If you are making a change to existing data, the entire field must be re coded. For example, if the name shown in Item 232 - Features Intersected, has been misspelled, the entire name must be reentered, not just one or two letters corrected.
 - If you want to blank out an entire field, type an asterisk (*) in the update field. The existing data contained in that field will be erased and the field will be blank after the record is processed. Some fields cannot be blank, in which case the asterisk will not be processed.
3. When all updates are complete to the satisfaction of the Team Leader responsible for the bridge inspection, the report is submitted to the state of "Lock." At this point, and depending on the procedures of the bridge owner, the inspection report and the inventory data is given to the Team Leader's Program Manager or supervisor for their review. This internal review falls under the heading of Quality Control (QC) and is an important step in the release process. Once the Program Manager or supervisor is satisfied with the report, the UCD is sent to either the Local Agency or BPO Bridge Inventory Engineer for final review of the inventory data and subsequent release to the bridge inventory.
 4. WSDOT Team Leaders typically submit paper copies of approved inspection reports to the BPO Bridge Inventory Engineer for review and release. See Chapter 7 for details on WSDOT procedures.

Local agency Team Leaders and/or consultants should create a Selection Set of approved UCD's which can be sent to the Local Agency Bridge Inventory Engineer for review.

The UCD's are reviewed to ensure correctness and consistency before the data is released to the Inventory.

Any errors found will be noted and returned to the bridge owner or Team Leader for corrections. Once the corrections are made, the UCD is again submitted for review. Once the Inventory Engineer is satisfied with the correctness of the UCD it is released to the Bridge Inventory. At this point, the UCD becomes an MCD and can no longer be changed. An MCD is a permanent part of the bridge record history and further changes must be made through the UCD process.

5. After release, the Bridge Inspection Report and the WSBIS Bridge Inventory Report are printed. The final validation of the inspection report is completed when the Bridge Inspection Team members sign the report. The report is then added to the inspection history in the official bridge file and the previous WSBIS Inventory Report is replaced with the current report.

This process must be completed within 90 days of the inspection date but it is recommended that the release is done as soon as possible. The quality of the inspection report tends to degrade through an extended review. Instead, complete the release process on the UCD and make any later corrections through an Informational UCD.

VI. Deleting/Transferring the Inventory Record

When an inventory record becomes obsolete, it needs to be changed from “Active” to “Inactive” status in the WSBIS database. The reasons a record may become obsolete include:

- A bridge has been bypassed and is no longer in use, or
- A bridge has been demolished, or
- A bridge has been permanently closed to traffic.

If a new bridge replaces an existing bridge, the agency must obsolete the old record and establish a new inventory record.

To obsolete the inventory record of a local agency bridge, the bridge owner should send an email listing the control data for each bridge to be deleted to either the WSDOT Local Agency Bridge Engineer or the Local Agency Bridge Inventory Engineer. This email shall include the Structure Identification Number and Bridge Name along with instructions that the record is to be deleted. The Local Agency Bridge Engineer will request that the record be obsoleted under the procedures defined in Section 2-3.4.

If the jurisdiction of a bridge is being transferred from one agency to another, the bridge record shall not be obsoleted.

Instead, the Owner Code, Custodian Code and, if necessary, the City Code shall be updated by the original owner prior to sending the bridge records to the new owner. For example:

The city of Selah has expanded its boundaries and annexed a bridge from Yakima County.

Yakima County would update the Owner Code from 02 to 04, the Custodian Code the same if appropriate, and the City Code from 0000 to 1155 prior to the data being submitted for update. Selah would then be responsible to correct the Bridge Number and all other data for the Inventory record.

This will ensure that a given bridge retains its unique Structure Identifier throughout the life of the bridge. See Section 2-2.1 for additional information on bridge ownership transfers.

A sample of the entire WSBIS Inventory Report is shown in the Section 3-5.

Reports Tab

WSBIS Item 1990 – Inspection Date	Pulldown
WSBIS Item 1991 – Inspection Frequency (months)	N(3,0)
WSBIS Item 2920 – Report Type	Check Box
WSBIS Item 2921 – Inspection Type	Pulldown

Applicable Structure Types

- All structure records

Editing Report Types. A check is required in this box on at least one Report Type every time you create an update. This check mark is reflected to the right of the Report Type label as a Green Check Mark indicating that this Report Type is the focus of the current update. Other Report Types not checked are not the current focus but should not be removed from the update in order to retain the continuity of the Structure record except under specific circumstances described below.

Adding and Removing Report Types. Under most circumstances the assigned report type(s) never change for the life of the structure. Occasionally users may need to add or remove a report type based on changed circumstances or simply to update the record with information not collected as part of a field inspection. Report types are added and removed using the “Select Report Types button in the lower right corner of the input form. Users must clearly understand how inspection reports should be used before modifying the report types associated with a structure. Please refer to Tables 2920a through d and Chapter 3 for more information.

Table 2920a summarizes all the Report Types, Inspection Types, Inspection Dates/Frequencies, and how these fields relate to the NBI and NTI.

Table 2920a Report Types and Inspection Types

Report Type	Inspection Type Code	Inspection Type	NBI Item		NTI Item	
			Insp. Date	Insp. Freq.	Insp. Date	Insp. Freq.
Routine ¹	N/A		90	91	D.2	D.3
Fracture Critical ¹	N/A		93A	92A	-	-
Underwater ¹	N/A		93B	92B	-	-
Special Feature ¹	1	Movable	93C	92C	-	-
	2	Floating	93C	92C	-	-
	3	Suspension	93C	92C	-	-
	4	Redundant Pin and Hanger	93C	92C	-	-
	5	Segmental	93C	92C	-	-
	6	Ferry Terminal	93C	92C	-	-
	7	High Strength Steel	93C	92C	-	-
	8	Structure with Temporary Support	93C	92C	-	-
	9	Cable Stayed	93C	92C	-	-
	0	Other	93C	92C	-	-
Short Span	-		-	-	-	-
Condition	-		-	-	-	-
Primary Safety	-		-	-	-	-

Table 2920a Report Types and Inspection Types

Report Type	Inspection Type Code	Inspection Type	NBI Item		NTI Item	
			Insp. Date	Insp. Freq.	Insp. Date	Insp. Freq.
Damage	A	Overheight	-	-	D.5	-
	B	Lateral Damage to Vertical Member	-	-	D.5	-
	E	Flood	-	-	D.5	-
	G	Earthquake	-	-	D.5	-
	H	Bridge Rail	-	-	D.5	-
	O	Other	-	-	D.5	-
	S	Reported by Others - Overheight	-	-	D.5	-
	T	Reported by Others - Lateral	-	-	D.5	-
	U	Reported by Others - Bridge Rail	-	-	D.5	-
In-Depth	-		-	-	D.4	-
Interim	-		-	-	D.6	-
UW Interim	-		-	-	-	-
Routine Mechanical ²						
Routine Electrical ²						
Secondary Safety	-		-	-	-	-
Geometric	-		-	-	-	-
Inventory	-		-	-	-	-
Feature	-		-	-	-	-
Equipment	-		-	-	-	-
2 Man UBIT	-		-	-	-	-
Informational	-		-	-	-	-

1. These report types are used only for structures subject to the NBIS or NTIS. If a structure does not meet this criteria, another report type must be used (usually Short Span, Primary/Secondary Safety or Condition report types). Refer to Chapter 3 for more detailed descriptions of report types.
2. Mechanical and Electrical report types created automatically by the Complex Structures system.

Table 2920b identifies four “core” report types. Every structure in WSBIS must have one of these report types, and except when structures have multi-agency inspections, only one of these core reports should be associated with each structure. Their usage is summarized in this table but more detailed guidance is provided in Chapter 3.

Table 2920b Core Report Types

Report Type	Structure Characteristics	Typical Examples
Routine	Structures subject to the NBIS or NTIS	Highway bridges over 20 feet long
Short Span	Structures not subject to the NBIS or NTIS and do carry public roadways	Highway bridges under 20 feet long
Condition	Structures not subject to the NBIS or NTIS and don't carry public roadways	Pedestrian bridges owned by highway agency
Primary Safety	Structure has a public roadway undercrossing	Railroad bridges over highway OR multi-agency inspection responsibility ¹

1. Multi-agency bridges are only case where more than one core report type can be associated with a structure.

Table 2920c identifies supplemental report types that can be added to a structure record in addition to one of the core report types. Their usage is summarized in this table but more detailed guidance is provided in Chapter 3.

Table 2920c Supplemental Report Types

Supplemental Report Type	Associated Core Report Type	Usage	Typical Examples
Fracture Critical	Routine	Use for bridges subject to the NBIS and deemed fracture critical.	Steel Truss bridges.
Underwater	Routine	Use for bridges subject to the NBIS when piers or abutments are permanently underwater exceeding wading depths.	Bridges with foundations in deep water.
Special Feature	Routine	Use for bridges subject to the NBIS and deemed to have special features.	Suspension bridges, pin & hanger components
Damage	Any	Use when structure has sustained damage from a specific event, as opposed to environmental degradation or wear.	Earthquakes, floods, vehicle hits.
In-Depth	Any	Use when a structure needs a one-time targeted inspection for any reason.	Preparing a detailed condition assessment for a repair or rehabilitation contract.
Interim	Routine, Condition	Use when some structure components need more frequent inspection. Dovetail inspection date and frequency with associated report type.	Decayed timber, cracked steel in redundant/secondary components, significant structural movement, significant scour accessible by wading
UW Interim	Underwater	Use when some underwater structure components need more frequent inspections. Dovetail inspection date and frequency with Underwater report type.	Underwater components with significant structural damage, significant scour not accessible by wading
Routine Mechanical	Routine	Generated automatically when a mechanical inspection report is completed in the Complex Structures system.	Tunnels and movable bridges with mechanical components.
Routine Electrical	Routine	Generated automatically when a electrical inspection report is completed in the Complex Structures system.	Tunnels and movable bridges with electrical components.
Secondary Safety	Primary Safety	Use when more than one agency performs a safety inspection	Railroad bridge over a state route and a city street.
Geometric	Any	Use to document collection of vertical and horizontal clearance data	Bridges with highway and/or railroad undercrossings; through trusses or arches with superstructure over the deck.
Inventory	Any	Use when creating a new structure record or when an existing structure is significantly modified.	Adding a new structure to the inventory. Whenever a bridge is rehabilitated, widened, seismically retrofitted, or otherwise significantly modified.

Table 2920c Supplemental Report Types

Supplemental Report Type	Associated Core Report Type	Usage	Typical Examples
Feature	Any	Use for certified and non-certified inspectors to document time spent in bridge inspection activities. Also use for unscheduled non reoccurring inspections.	Co-inspector working on road crew documents bridge rail damage observed while in the area of the bridge. One time only chain drag of deck. Evaluation of bridge for overload permit.
Equipment	Any	Used only by local agencies at their option to schedule inspection equipment. Alternately this equipment can be scheduled within the Report Type resources grid.	
2 Man UBIT	Any	Used only when one agency provides a UBIT and UBIT operator, but no lead inspector.	
Informational	Any	Use to update a structure record with information not generally collected during a field inspection.	Updating route data, including ADT, functional classification, and NHS designation. Also used for ownership transfers and obsoleting structures.

Table 2920d summarizes the inspection frequencies associated with each report type, and in particular identifies the five report types that are not scheduled, and therefore do not have inspection frequencies. Frequencies are summarized in this table but more detailed guidance is provided in Chapter 3.

Table 2920d Report Type Inspection Frequencies

Report Type	Inspection Frequency
Routine	Usually 24 months
Fracture Critical	24 months maximum
Underwater	Usually 60 months
Special Feature	Varies based on engineering evaluation
Short Span	Varies based on owning agency guidelines
Condition	Varies based on owning agency guidelines
Primary Safety	Varies based on inspecting agency guidelines
Damage	NOT SCHEDULED - no inspection frequency
In-Depth	NOT SCHEDULED - no inspection frequency
Interim	Varies as needed to dovetail with associated core report type
UW Interim	Varies as needed to dovetail with Underwater report type
Routine Mechanical	12 months
Routine Electrical	12 months
Secondary Safety	Varies based on inspecting agency guidelines
Geometric	Varies based on owning agency guidelines
Inventory	NOT SCHEDULED - no inspection frequency
Feature ¹	NOT SCHEDULED - no inspection frequency
Equipment	Varies based on owning agency guidelines
2 Man UBIT	Varies based on owning agency guidelines
Informational ¹	NOT SCHEDULED - no inspection frequency

1. The Informational and Feature report types are unique because a user can create and release this report type, but the next time a user creates a new UCD they are automatically removed. All other report types - scheduled or unscheduled - must be manually removed by the user as part of editing another report type.

WSBIS Item 2922 – Inspection Due Date	Calculated
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Applicable Structure Types

- All structure records

This field is automatically calculated based on the inspection date and frequency. When an inspection was performed in a month later than expected, this calculation will restore the next due date to the original due month.

WSBIS Item 2923 – Inspection Due Date Override	Pulldown
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Applicable Structure Types

- All structures owned by a Washington State Agency

This field should remain blank under most circumstances. However, in cases where the calculated due date needs to be adjusted, insert the desired next inspection date in this field. For Routine, FC, Underwater, and Special Feature report types, this override due date cannot cause the next inspection to exceed the calculated due date and frequency without prior approval by the program manager.

WSBIS Item 2924 – Report Type Notes	AN(unlimited)
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Applicable Structure Types

- All structure types

This field is should remain blank under most circumstances, and is intended to describe unusual details specific to the report type. This note field can be used to explain:

- Adding an Inspection Due Date Override
- What data is updated in an informational report type

This field is not intended to hold inspection findings or explain specific information about Damage or Interim report types – use the zero note instead.

WSBIS Item 2646 – Lead Inspector Initials	Pulldown
WSBIS Item 2649 – Lead Inspector Certification Number	Computed

Applicable Structure Types

- All structure records

Code the lead inspector initials who performed the inspection for selected report types as designated in Table 2646 that require a lead inspector. When lead inspectors perform inspections for report types that do not require a team leader, they should still populate these fields.

Based on the lead inspector initials, the lead inspector certification number is automatically populated. When no lead inspector was involved in the inspection, these fields should remain blank.

Table 2646 Lead Inspector Initials and Certification

Required	Not required
Routine	Short Span
Fracture Critical	Condition
Underwater	Primary Safety
Special Feature	Secondary Safety
Damage	Geometric
In Depth	Inventory
Interim	Feature
UW Interim	Equipment
Routine Mechanical	2 Man UBIT
Routine Electrical	Informational

Lead inspectors must maintain current certification in order to successfully complete the inspection documentation in the WSBIS application. See Chapter 1 for more information.

WSBIS Item 2654 – Co-Inspector Initials	AN(8,0)
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Applicable Structure Types

- All structure records

These are the initials of the individual who either assisted the lead inspector in performing an inspections or updated the bridge record using one of the reports types that doesn't require a lead inspector. See Table 2646.

WSBIS Item 2642 – Inspection Hours	N(4,1)
WSBIS Item 2643 – Inspection Overtime Hours	N(4,1)

Applicable Structure Types

- All structure records

This is the total number of field inspection hours (to the nearest half hour) that the inspection team spent on the bridge while performing an inspection of the designated report type. When multiple inspection teams are needed for an inspection, code the cumulative hours for each team.

Leave blank for report types that are not field based (Informational, for example).

WSBIS Item 7644 – Inspection Report Hours	N(4,1)
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Applicable Structure Types

- **Optional for all local agency structures**

This is the total number of hours that the inspection team spent on creating or updating the inspection report within BridgeWorks. This field is only used by local agency owners or their consultants.

WSBIS Item 2900 – Late Inspection Explanation	AN(500)
WSBIS Item 2901 – Program Manager Response Date	Pulldown
WSBIS Item 2902 – Program Manager Approval	Pulldown

Applicable Structure Types

- **All structures subject to the NBIS or NTIS**

The Program Manager Oversight information is made up of the following three fields:

1. Late Inspection Explanation

For any NBI or NTI reportable inspection type, when an inspection is or will be performed later than the calculated month due, an explanation must be provided for the delinquency. Commonly acceptable explanations include:

- Inspection performed on a week split between two months and the inspection was performed in the “late” month.
- Severe weather (describe weather condition)
- Inspector safety (describe safety issue)

Other explanations will be considered on a case by case basis by the PM or DPM in coordination with FHWA.

2. Program Manager Response Date

Enter the date of the Program Manager’s response to the Late Inspection Explanation. This field can only be edited using the Inventory Management managed operation and as directed by the PM or DPM.

3. Program Manager Approval

Enter a Y – Approved or N – Disapproved to indicate the Program Manager’s response. This field can only be edited using the Inventory Management managed operation and as directed by the PM or DPM. If Washington State is under an active Plan of Corrective Action (PCA) then approval falls to the FHWA Washington Division Bridge Engineer.

NBI Tab

Adequacy Appraisals

The items in the appraisal section are used to evaluate bridges and culverts carrying public roadways in relation to the level of service which it provides on the highway system of which it is a part. The structure will be compared to a new one which is built to current standards for that particular type of road as further defined in this section except for WSBIS Item 1661 – Approach Roadway Alignment. See WSBIS Item 1661 for special criteria for rating that item.

WSBIS Items 1657, 1658, 1659, 1661, and 1662 will be coded with a 1-digit code that indicates the appraisal rating for the item. The ratings and codes are as follows:

Table 4 NBI Adequacy Appraisal Ratings

WSBIS Code	NBI Code	Description
9	N	Not applicable
8	9	Superior to present desirable criteria
8	8	Equal to present desirable criteria
7	7	Better than present minimum criteria
6	6	Equal to present minimum criteria
5	5	Better than minimum tolerable limits
4	4	Meets minimum tolerable limits to be left in place as is
3	3	Basically intolerable requiring high priority corrective action
2	2	Basically intolerable requiring high priority replacement
1	1	This value of rating code not used
0	0	Bridge closed

WSBIS Items 1657, 1658, 1659 are calculated automatically based on other coded items.

Completed bridges not yet opened to traffic, if rated, shall be appraised as if open to traffic. Design values, for example ADT, shall be used for the evaluation. The data provided will include a code of G for WSBIS Item 1293 – Structure Open, Posted, or Closed to Traffic.

NBI Commentary:

WSBIS uses the 9 code to indicate “Not applicable,” which is translated to N when reported to the NBI. WSBIS uses code 8 for “Superior or equal to present desirable criteria,” which is a combination of NBI codes 8 and 9. (WSBIS does not submit a code 9 to the NBI.)

WSBIS Item 1657 Structural Evaluation**Calculated**

NBI Item 67

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

This item is calculated automatically and cannot be edited.

Structural Evaluation rates the adequacy of the structure's condition, taking into account any major structural deficiencies. This rating is based on the overall condition of the superstructure, substructure, the inventory rating, and the ADT.

Table 1657 explains how the inventory rating and Proposed Improvements may further lower this code. The code for this item is no higher than the lowest of the condition codes for Superstructure Overall, Substructure Condition, or Culvert Condition.

Table 1657 Structural Adequacy Appraisal Rating

Inventory Rating HS Truck (Tons)			Structural Adequacy Appraisal Rating Code
ADT 0-500	ADT 501-5000	ADT >5000	
>36	>36	>36	9
36	36	36	8
31	31	31	7
23	25	27	6
18	20	22	5
12	14	18	4
Inventory rating less than value in rating code of 4 and requiring corrective action.			3
Inventory rating is less than above and bridge requires replacement (WSBIS Item 1844, Proposed Improvement Work Type is coded 31 or 32).			2
Bridge is closed and requires replacement.			0

NBI Commentary:

The use of the Proposed Improvement Work Type code in the calculation is not documented in the FHWA Coding Guide.

WSBIS Item 1658 – Deck Geometry**Calculated**

NBI Item 68

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

This item is calculated automatically and cannot be edited.

The level of service provided by the bridge is evaluated with respect to the highway system of which it is a part. This appraisal is based on the number of traffic lanes, the curb-to-curb width, the minimum vertical clearance over the bridge deck, the ADT, and the federal functional classification.

The following tables explain how the values are determined with respect to the highway system of which the bridge is a part. The lowest code determined from the tables is used.

Use this guide to determine which table to use.

Table 1658a Deck Geometry Guide to Cases

Direction of Traffic	Number of Lanes	Curb to Curb Width	Table to Use
2 way non-interstate	3+		Table 1658d
2 way non-interstate	2		Table 1658b
2 way non-interstate	1	< 16'	Table 1658c
2 way non-interstate	1	≥16'	Table 1658b
1 way non-interstate	1		Table 1658b
1 way non-interstate	2 or more		Table 1658d
Ramp	any		Table 1658e
1 way interstate	any		Table 1658d
2 way interstate	any		Table 1658d

For all bridges with a vertical clearance restriction over the deck, also use Table WSBIS-1658f. Use whichever rating code is lower.

Table 1658b Deck Geometry Appraisal Rating Case 1

Curb-to-Curb Bridge Roadway Width						Deck Geometry Appraisal Rating Code
ADT 0-100	ADT 101-400	ADT 401-1000	ADT 1-2k	ADT 2-5k	ADT >5k	
not applicable						9
≥32	≥36	≥40	≥44	≥44	≥44	8
28	32	36	40	44	44	7
24	28	30	34	40	44	6
20	24	26	28	34	38	5
18	20	22	24	28	32(28) ²	4
16	18	20	22	26	30(26) ²	3
Bridge is open and has a width less than required for a rating code of 3 and bridge is open.						2
Bridge is closed.						0

Notes:

1. Use the lower rating code for roadway widths between those shown.
2. For structures longer than 200 feet, use the values shown in parentheses.

Table 1658c Deck Geometry Appraisal Rating Case 2

Curb-to-Curb Bridge Roadway Width		Deck Geometry Appraisal Rating Code
ADT 0-100	ADT >100	
not applicable		9
<16	-	8
15	-	7
14	-	6
13	-	5
12	-	4
11	<16	3
Bridge is open and has a width less than required for a rating code of 3.		2
Bridge is closed.		0

Note:

Use the lower rating code for roadway widths between those shown.

Table 1658d Deck Geometry Appraisal Rating Case 3

Curb-to-Curb Bridge Roadway Width - 2 or More Lanes in Each Direction				Deck Geometry Appraisal Rating Code
Number of Lanes (N) (Interstate)		Number of Lanes (N) (Other Roadways)		
2 Lanes	> 2 Lanes	2 Lanes	> 2 Lanes	
not applicable				9
≥ 42	≥ 12N + 24	≥ 42	≥ 12N + 18	8
40	12N + 20	38	12N + 15	7
38	12N + 16	36	12N + 12	6
36	12N + 14	33	11N + 10	5
34 (29) ²	11N + 12	30	11N + 6	4
	(11N + 7) ²			
33 (28) ²	11N + 11	27	11N + 5	3
	(11N + 6) ²			
Bridge is open and has a width less than required for rating code of 3 and bridge open to traffic.				2
Bridge is closed.				0

Notes:

1. Use the lower rating code for roadway widths between those shown.
2. For structures longer than 200 feet, use the values shown in parentheses.

Table 1658e Deck Geometry Appraisal Rating Case 4

Curb-to-Curb Ramp Bridge Roadway Width		Deck Geometry Appraisal Rating Code
1 Lane	> 1 Lane	
Not Applicable		9
≥ 26	$\geq 12N + 12$	8
24	$12N + 10$	7
22	$12N + 8$	6
20	$12N + 6$	5
18	$12N + 4$	4
16	$12N + 2$	3
Bridge is open and has deck width less than required for a rating code of 3.		2
Bridge is closed.		0

Note:

Use the lower rating code for roadway widths between those shown.

Table 1658f Deck Geometry Appraisal Rating Case 5

Functional Class				Deck Geometry Appraisal Rating Code
Interstate and Other Freeway		Other Principal and Minor Arterials	Major and Minor Collectors and Locals	
Designated Routes ²	Undesignated Routes ²			
Minimum Vertical Clearance				
not applicable				
≥ 17' - 0"	≥ 16' - 0"	≥ 16' - 6"	≥ 16' - 6"	9
16' - 9"	15' - 6"	15' - 6"	15' - 6"	8
16' - 6"	14' - 6"	14' - 6"	14' - 6"	7
15' - 8"	14' - 3"	14' - 3"	14' - 3"	6
15' - 0"	14' - 0"	14' - 0"	14' - 0"	5
Vertical clearance is less than value for rating of 4; corrective action is required.				4
Vertical clearance is less than value for rating of 4 and bridge requires replacement (WSBIS Item 1844 Proposed Improvement Work Type is coded 31 or 32).				3
Bridge is closed.				2
				0

Notes:

1. Use the lower rating code for vertical clearances between those shown.
2. Use the first column (Designated Routes) for all routes except designated routes in urban areas where there is an alternative interstate or freeway facility with a minimum clearance of at least $16' - 0''$. Use the second column (Undesignated Routes) for all undesignated interstate or freeway facilities.

WSBIS Item 1659 – Underclearances**Calculated**

NBI Item 69

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

This item is calculated automatically and cannot be edited.

This appraisal is based on the vertical and lateral underclearances beneath the bridge as related to the federal functional classification of the roadway carried beneath the bridge. If the bridge is not over a highway or a railroad, the field will be set to 9.

Minimum vertical underclearance, minimum lateral underclearance on right, and minimum lateral underclearance on left are used to evaluate this item.

See the following tables for an explanation of how the values are calculated.

The functional classification used in the tables is for the route under the bridge. If no Under record exits, it is assumed that the route under the bridge is a major or minor collector or a local road for the purpose of using the tables.

Table 1659a Vertical Underclearance Adequacy Appraisal Rating

Functional Class				Railroads	Underclearance Adequacy Appraisal Rating Code
Interstate and Other Freeway		Other Principal and Minor Arterials	Major and Minor Collectors and Locals		
Designated Routes ²	Undesignated Routes ²				
Minimum Vertical Underclearance					Rating Code
not applicable					
≥ 17' - 0"	≥ 16' - 0"	≥ 16' - 6"	≥ 16' - 6"	≥ 23' - 0"	9
16' - 9"	15' - 6"	15' - 6"	15' - 6"	22' - 6"	8
16' - 6"	14' - 6"	14' - 6"	14' - 6"	22' - 0"	7
15' - 9"	14' - 3"	14' - 3"	14' - 3"	21' - 0"	6
15' - 0"	14' - 0"	14' - 0"	14' - 0"	20' - 0"	5
Vertical Clearance is less than value for rating of 4; corrective action is required.					4
Vertical clearance is less than value for rating of 4 and bridge requires replacement (WSBIS Item 1844 Proposed Improvement Work Type is coded 31 or 32).					3
Bridge closed.					2
					0

Notes:

1. Use the lower rating code for vertical clearances between those shown.
2. Use the first column (Designated Routes) for all routes except designated routes in urban areas where there is an alternative interstate or freeway facility with a minimum clearance of at least 16' - 0". Use the second column (Undesignated Routes) for all undesignated interstate or freeway facilities.

Table 1659b Lateral Underclearance Adequacy Appraisal Rating

Functional Class						Railroads	Underclearance Adequacy Appraisal Rating Code	
1-Way Traffic				2-Way Traffic				
Principal Arterials (Interstate, etc.)				Other Principal & Minor Arterials	Major & Minor Collectors and Locals			
Main Line		Ramp						
Lt.	Rt.	Lt.	Rt.					
Minimum Lateral Underclearance								
not applicable								9
≥ 30	≥ 30	≥ 4	≥ 10	≥ 30	≥ 12	≥ 20	8	
18	21	3	9	21	11	17	7	
6	12	2	8	12	10	14	6	
5	11	2	6	10	8	11	5	
4	10	2	4	8	6	8	4	
Underclearance is less than value for rating of 4; corrective action is required.							3	
Underclearance is less than value for rating of 4 and bridge requires replacement (WSBIS Item 1844 Proposed Improvement Work Type is coded 31 or 32).							2	
Bridge is closed.							0	

Notes:

1. Use the lower rating code for lateral clearances between those shown.
2. Use the value from the Right Ramp column to determine the rating code when acceleration or deceleration lanes or ramps are provided under 2-way traffic.

WSBIS Item 1661 – Alignment**Pulldown**

NBI Item 72

Applicable Structure Types

- Bridges & culverts carrying public roadways

Code the rating based on the adequacy of the approach roadway alignment. This item identifies those bridges which do not function properly or adequately due to the alignment of the approaches. It is not intended that the approach roadway alignment be compared to current standards but rather to the existing highway alignment. This concept differs from other appraisal evaluations. The establishment of set criteria to be used at all bridge sites is not appropriate for this item. The basic criteria is how the alignment of the roadway approaches to the bridge relate to the general highway alignment for the section of highway the bridge is on.

Speed reductions necessary because of structure width and not alignment shall not be considered in evaluating this item.

Table 1661 Approach Roadway Alignment Appraisal Rating

WSBIS Code	Description
9	Not applicable (non-vehicular traffic on the structure).
8	No reduction in speed required for vehicle as it approaches the bridge.
6	Minor reduction in speed required for vehicle (less than 10 mph) as it approaches the bridge.
3	Substantial reduction in the speed of vehicle (10 mph or greater) as it approaches the bridge.

WSBIS Item 1662 – Waterway**Pulldown**

NBI Item 71

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

This item appraises the waterway opening with respect to passage of flow through the bridge. Site conditions may warrant somewhat higher or lower ratings than indicated by the table (e.g., flooding of an urban area due to a restricted bridge opening).

Where overtopping frequency information is available, the descriptions given in the table for chance of overtopping mean the following:

Remote – greater than 100 years

Slight – 11 to 100 years

Occasional – 3 to 10 years

Frequent – less than 3 years

Adjectives describing traffic delays mean the following:

Insignificant – Minor inconvenience. Highway passable within hours.

Significant – Traffic delays of up to several days.

Severe – Long term delays to traffic.

Table 1662 Waterway Adequacy Appraisal Rating

WSBIS Item 1487 – Functional Class			Description
01, 11, 12	02, 06, 07, 14, 16, 17	08, 09, 18, 19	
Waterway Adequacy Appraisal Rating			
9	9	9	Bridge not over a waterway.
8	8	8	Bridge deck and roadway approaches above flood water elevations. Remote chance of overtopping OR bridge deck above roadway approaches. Slight chance of overtopping roadway approaches.
6	6	7	Slight chance of overtopping bridge deck and roadway approaches.
4	5	6	Bridge deck above roadway approaches. Occasional overtopping of roadway approaches with insignificant traffic delays.
3	4	5	Bridge deck above roadway approaches. Occasional overtopping of roadway approaches with significant traffic delays.
2	3	4	Occasional overtopping of bridge deck and roadway approaches with significant traffic delays.
2	2	3	Frequent overtopping of bridge deck and roadway approaches with significant traffic delays.
2	2	2	Occasional or frequent overtopping of bridge deck and roadway approaches with severe traffic delays.
0	0	0	Bridge closed.

BPO Specific Instructions:

BPO inspection staff inspecting bridges with records maintained by BPO do not code this field, which is maintained by the BPO Scour Engineer. If an inspector has information relevant to this code, that information notify the Scour Engineer and adjust the notes under his/her direction.

NBI Commentary:

WSBIS uses the 9 code to indicate “Not applicable,” which is translated to N when reported to the NBI.

WSBIS Item 1660 – Operating Level**Pulldown**

NBI Item 70

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

The National Bridge Inspection Standards require the posting of load limits if the operating rating factor (RF) for any of the legal load configurations in the State is less than 1 based on the Load Factor Method (LFR) or the Allowable Stress Method (ASR); and less than 1 based on the Load and Resistance Factor Method. If the load capacity is such that posting is required, this item shall be coded 4 or less. If no posting is required at the operating rating, this item shall be coded 5.

This item evaluates the load capacity of a bridge in comparison to the State legal loads.

Although posting a bridge for load-carrying capacity is required only when the RF for any of the legal loads is less than 1, highway agencies may choose to post at a lower level. This posting practice may appear to produce conflicting coding when WSBIS Item 1293 – Structure Open, Posted or Closed to Traffic is coded to show the bridge as actually posted at the site and WSBIS Item 1660 – Bridge Posting is coded as bridge posting is not required. Since different criteria are used for coding these 2 items, this coding is acceptable and correct.

The use or presence of a temporary bridge affects the coding. The actual operating rating of the temporary bridge should be used to determine this item. However, the highway agency may choose to post at a lower level. This also applies to bridges shored up or repaired on a temporary basis.

The coding shall be based on the lowest rating factor of the legal loads.

The following are Washington State maximum legal load configurations and tonnages:

Table 1660a Legal Loads

Configuration	Tonnage
AASHTO Type 3	25 Tons
AASHTO Type 3-2	36 Tons
AASHTO Type 3-3	40 Tons
SU4	27 Tons
SU5	31 Tons
SU6	34.7 Tons
SU7	38.7 Tons
EV2	28.7 Tons
EV3	43 Tons

See the *Bridge Design Manual* Chapter 13 for more information.

For WSDOT owned structures, the BPO Load Rating Engineer shall make the change to the code, and not the field inspector.

Table 1660b Operating Level Code

WSBIS Code	Operating Rating Factors based on LFR or ASR Methods or Rating Factors based on LRFR
5	$RF \geq 1$
4	$1 < RF \geq 0.9$
3	$0.9 < RF \geq 0.8$
2	$0.8 < RF \geq 0.7$
1	$0.7 < RF \geq 0.6$
0	$0.6 < RF$
N	No rating analysis performed (bridge does not carry traffic)

NBI Commentary:

WSDOT added code N to address structures which do not carry traffic.

Text supplemented to explicitly list Washington State legal loads and tonnages.

WSBIS Item 1293 – Open, Closed or Posted

Pulldown

NBI Item 41

NTI Item L.4

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Tunnels carrying public roadways within

This item provides information about the actual operational status of a structure. One of the following codes shall be used:

Table 1293 Open, Closed, Posted Code

WSBIS Code	Description
A	Open, no restriction
B	Open, posting recommended but not legally implemented (all signs not in place or not correctly implemented)
D	Open, would be posted or closed except for temporary shoring, etc., to allow for unrestricted traffic
E	Open, temporary structure in place to carry legal loads while original structure is closed and awaiting replacement or rehabilitation
G	New structure not yet open to traffic
K	Structure closed to all traffic
P	Posted for load (may include other restrictions such as temporary structures which are load posted)
R	Posted for other load-capacity restriction (speed, number of vehicles on structure, etc.)

WSBIS Item 2613 – NBIS Risk Category	Calculated
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Applicable Structure Types

- All structure records

The NBIS risk category is based on the FHWA Metrics for the Oversight of the National Bridge Inspection Program, also called the “23 metrics”:

www.fhwa.dot.gov/bridge/nbip/metrics.pdf

High risk structures are considered more vulnerable to failure and therefore are held to a higher standard of NBIS compliance in the 23 metrics, and applies only to Routine report types as defined in Table 2613.

Table 2613 FHWA Risk Category for Routine Inspections

WSBIS Item	Routine Inspection Risk Criteria
H	High risk based on any ONE of the following criteria:
	1. Low superstructure, substructure or culvert condition codes WSBIS Items 1671, 1676 or 1678 < 5
	2. Legal load posting required WSBIS Item 1660 < 5
	3. No load rating AND posting not required AND posting recommended or implemented WSBIS Item 1551=5 and WSBIS Item 1660=5 and WSBIS Item 1293=B, P, or R
	4. Scour critical or scour vulnerability unknown WSBIS Item 1680 = 0, 1, 2, 3, 6, T or U
L	Low risk, does not meet high risk criteria
N	Does not apply, no routine inspection report type

Bridges that also have Underwater report types are separately identified as high risk in the 23 metrics based on criteria 1 without the superstructure code and criteria 4 as described in Table 2613.

Condition Codes

WSBIS Items 1663, 1671, 1676, 1677, and 1678

NBI Items 58, 59, 60, 61, and 62

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways*

In order to promote uniformity between bridge inspectors, these guidelines will be used to rate and code WSBIS Items 1663, 1671, 1676, 1677, and 1678.

Condition ratings are used to describe the existing, in-place bridge as compared to the as-built condition. Evaluation is for the materials related, physical condition of the deck, superstructure, and substructure components of a bridge. The condition evaluation of channels and channel protection and culverts is also included. Condition codes are properly used when they provide an overall characterization of the general condition of the entire component being rated. Conversely, they are improperly used if they attempt to describe localized or nominally occurring instances of deterioration or disrepair. Correct assignment of a condition code must, therefore, consider both the severity of the deterioration or disrepair and the extent to which it is widespread throughout the component being rated.

The load-carrying capacity will not be used in evaluating condition items. The fact that a bridge was designed for less than current legal loads and may be posted shall have no influence upon condition ratings.

Portions of bridges that are being supported or strengthened by temporary members will be rated based on their actual condition; that is, the temporary members are not considered in the rating of the item. (See WSBIS Item 1289 – Temporary Structure Designation for the definition of a temporary bridge.)

Completed bridges not yet opened to traffic, if rated, shall be coded as if open to traffic.

* Pedestrian, RR, and other non-vehicular bridges over public roadways do not require condition codes. WSDOT policy for WSDOT owned structures is to provide condition codes when the Condition Report type is used.

The following general condition ratings shall be used as a guide in evaluating WSBIS Items 1663, 1671 and 1676:

Table 5 Condition Rating

WSBIS Code	NBI Code	Description
9	N	Not applicable
8	9	Excellent condition - no problems noted
8	8	Very good condition – no problems noted.
7	7	Good condition – some minor problems.
6	6	Satisfactory condition – structural elements show some minor deterioration.
5	5	Fair condition – all primary structural elements are sound but may have minor section loss, cracking, spalling or scour.
4	4	Poor condition – advanced section loss, deterioration, spalling or scour.
3	3	Serious condition – loss of section, deterioration, spalling or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present.
2	2	Critical condition – advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.
1	1	“Imminent” failure condition – major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic but corrective action may put back in light service.
0	0	Failed condition – out of service beyond corrective action.

NBI Commentary:

WSBIS uses the 9 code to indicate “Not applicable,” which is translated to N when reported to the NBI. WSDOT uses condition code 8 for all cases where a bridge is in “Excellent” or “Very good” condition.

WSBIS Item 1663 – Deck Condition**Pulldown**

NBI Item 58

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways*

This item describes the overall condition rating of the deck. Rate and code the condition in accordance with the above general condition ratings.

The following structures shall be coded 9:

- Culverts
- Filled arch bridges
- Buried structures (bridges with fill depth greater than B/2, using B as defined in WSBIS Item 1340 Structure Length)

Bridges with fill depth less than B/2 shall be considered to have a deck and coded appropriately.

Deck condition ratings are also associated with deck BMS elements as shown in Chapter 4. If the inspector determines a deck code should be different from that indicated in Chapter 4 guidance, an explanation for this difference should be noted in the inspection report.

Concrete decks should be inspected for cracking, scaling, spalling, leaching, chloride contamination, potholing, delamination, and full or partial depth failures. Steel grid decks should be inspected for broken welds, broken grids, section loss, and growth of filled grids from corrosion. Timber decks should be inspected for splitting, crushing, fastener failure, and deterioration from rot.

The condition of the wearing surface/protective system, joints, expansion devices, curbs, sidewalks, parapets, fascias, bridge rail, and scuppers shall not be considered in the overall deck evaluation. However, their condition should be noted on the inspection form under the appropriate BMS element note.

Decks integral with the superstructure will be rated as a deck only and not how they may influence the superstructure rating (for example, rigid frame, slab, deck girder or T-beam, voided slab, box girder, etc.). Similarly, the superstructure of an integral deck type bridge will not influence the deck rating.

Inspection report comments are required when the condition is coded 5 or less.

* Pedestrian, RR, and other non-vehicular bridges over public roadways do not require condition codes. WSDOT policy for WSDOT owned structures is to provide condition codes when the Condition Report type is used.

NBI Commentary:

This item has been modified to incorporate BMS deck element condition states into the coding criteria.

WSBIS Item 1671 – Superstructure Condition**Pulldown**

NBI Item 59

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways*

This item describes the physical condition of all structural members. Rate and code the condition in accordance with the previously described general condition ratings. Code 9 for culverts.

The structural members should be inspected for signs of distress which may include cracking, deterioration, section loss, and malfunction and misalignment of bearings.

The condition of bearings, joints, paint system, etc., shall not be included in this rating, except in extreme situations, but should be noted on the inspection form under the appropriate BMS element note.

On bridges where the deck is integral with the superstructure, the superstructure condition rating may be affected by the deck condition. The resultant superstructure condition rating may be lower than the deck condition rating where the girders have deteriorated or been damaged.

Fracture critical components should receive careful attention because failure could lead to collapse of a span or the bridge.

Inspection report comments are required when the condition is coded 5 or less.

* Pedestrian, RR, and other non-vehicular bridges over public roadways do not require condition codes. WSDOT policy for WSDOT owned structures is to provide condition codes when the Condition Report type is used.

WSBIS Item 1676 – Substructure Condition**Pulldown**

NBI Item 60

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways*

This item describes the physical condition of piers, abutments, piles, fenders, footings, or other components. Rate and code the condition in accordance with the previously described general condition ratings. Code 9 for culverts.

All substructure elements should be inspected for visible signs of distress including evidence of cracking, section loss, settlement, misalignment, scour, collision damage, and corrosion.

The substructure condition rating shall be made independent of the deck and superstructure.

Integral-abutment wingwalls to the first construction or expansion joint shall be included in the evaluation. For non-integral superstructure and substructure units, the substructure shall be considered as the portion below the bearings. For structures where the substructure and superstructure are integral, the substructure shall be considered as the portion below the superstructure.

In all cases, if WSBIS Item 1680 – Scour is 2 or less, WSBIS Item 1676 – Substructure shall be coded the same.

Inspection report comments are required when the condition is coded 5 or less.

* Pedestrian, RR, and other non-vehicular bridges over public roadways do not require condition codes. WSDOT policy for WSDOT owned structures is to provide condition codes when the Condition Report type is used.

NBI Commentary:

This item has been modified based on an April 27, 2001, FHWA memo regarding FHWA Items 60 and 113 (WSBIS Items 1676 and 1680). This memo is available at www.fhwa.dot.gov/engineering/hydraulics/policymemo/revguide.cfm.

WSBIS Item 1677 – Channel Protection Condition

Pulldown

NBI Item 61

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways*

This item describes the physical conditions associated with the flow of water through the bridge such as stream stability and the condition of the channel, riprap, slope protection, or stream control devices including spur dikes. The inspector should be particularly concerned with visible signs of excessive water velocity which may affect undermining of slope protection, erosion of banks, and realignment of the stream. Accumulation of drift and debris on the superstructure and substructure should be noted on the inspection form but not included in the condition rating.

Inspection report comments are required when the condition is coded 7 or less.

Note: A bridge with no scour potential (piles founded or on bedrock) can have a very low channel rating based on a threat to the approach fill. In this situation this code is the only way to flag the problem. Also note that roadway embankment erosion due to bridge or roadway runoff is NOT included in this field. These issues are addressed in the abutment BMS field.

* Pedestrian, RR, and other non-vehicular bridges over public roadways do not require condition codes. WSDOT policy for WSDOT owned structures is to provide condition codes when the Condition Report type is used.

Rate and code the condition in accordance with the following descriptive codes:

Table 1677 Channel Protection Condition Rating

WSBIS Code	Description
9	Not applicable. Use when bridge is not over a waterway (channel).
8	There are no noticeable or noteworthy deficiencies. Banks are protected or well vegetated. River control devices such as spur dikes and embankment protection are not required or are in a stable condition.
7	Bank protection is in need of minor repairs. River control devices and embankment protection have a little minor damage. Banks and/or channel have minor amounts of drift.
6	Bank is beginning to slump. River control devices and embankment protection have widespread minor damage. There is minor stream bed movement evident. Debris is restricting the channel slightly.
5	Bank protection is being eroded. River control devices and/or embankment have major damage. Trees and brush restrict the channel.
4	Bank and embankment protection is severely undermined. River control devices have severe damage. Large deposits of debris are in the channel.
3	Bank protection has failed. River control devices have been destroyed. Stream bed aggradation, degradation or lateral movement has changed the channel to now threaten the bridge and/or approach roadway.
2	The channel has changed to the extent the bridge is near a state of collapse.
1	Bridge closed because of channel failure. Corrective action may put back in light service.
0	Bridge closed because of channel failure. Replacement necessary.

WSBIS Item 1678 – Culvert Condition**Pulldown**

NBI Item 62

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways***

This item evaluates the alignment, settlement, joints, structural condition, scour, and other items associated with culverts. The rating code is intended to be an overall condition evaluation of the culvert. Integral wingwalls to the first construction or expansion joint shall be included in the evaluation.

Inspection report comments are required when the condition is coded 5 or less.

Defining culverts:

- Culverts always carry water, with only a few exceptions. These exceptions may include ancillary structures, for utility passage, old cattle undercrossing or other purposes, where the type and scope of construction may more realistically be quantified as a culvert. Most will only be non-reportable short spans, but Regional Supervisors must be consulted on these exceptions.
- Water Detention Vaults shall be coded as culverts.
- Concrete Boxes (continuous 4-sided) with or without roadway fill that carry water are coded as culverts.
- Circular and arch shaped structures with fill and no defined abutment or approach are coded as culverts.
- For Culverts, code Deck, Superstructure and Substructure (WSBIS Items 1663, 1671, and 1676) as 9.
- Code Bridge Rails and Transitions (WSBIS Items 1684 and 1685) N if there is sufficient roadway fill that there is no attachment to the structure. Guardrails and Terminals (WSBIS Items 1686 and 1687) are to be coded 0 or 1 as appropriate.
- When inspecting culverts, document the depth of the fill on both ends of the culvert. For cases where there is a significant amount of fill compared to the span length of the culvert, or total length of culverts where there are multiple barrels, estimate and document the depth of fill.
- Three sided rigid frames with fill greater than B/2 are coded as culverts.
- Culverts with structure lengths greater than 20 feet are NBI reportable regardless of fill depth.
- Culverts with structure lengths less than or equal to 20 feet are inventoried and coded in accordance with short span inspection requirements.

* Pedestrian, RR, and other non-vehicular bridges over public roadways do not require condition codes. WSDOT policy for WSDOT owned structures is to provide condition codes when the Condition Report type is used.

Rate and code the condition in accordance with the following descriptive codes:

Table 1678a Concrete Culvert Condition Rating

WSBIS Code	Description
9	Not applicable. Structure is not a culvert.
8	No noticeable or noteworthy deficiencies which affect the condition of the culvert. Insignificant scrape marks caused by drift.
7	Shrinkage cracks, light scaling, and insignificant spalling which does not expose reinforcing steel. Insignificant damage caused by drift with no misalignment and not requiring corrective action. Some minor scouring has occurred near curtain walls, wingwalls or pipes.
6	Minor deterioration or initial disintegration, minor chloride contamination, minor cracking with some leaching, or spalls on concrete or masonry walls and slabs. Local minor scouring at curtain walls, wingwalls or pipes.
5	Moderate to major deterioration or disintegration, extensive cracking and leaching, or spalls on concrete or masonry walls and slabs. Minor settlement or misalignment. Noticeable scouring or erosion at curtain walls, wingwalls or pipes.
4	Major deterioration (large spalls, heavy scaling, wide cracks, considerable efflorescence, or opened construction joint permitting loss of backfill). Considerable settlement or misalignment. Considerable scouring or erosion at curtain walls, wingwalls or pipes.
3	Excessive deterioration (any condition described in Code 4 but which is excessive in scope). Severe movement or differential settlement of the segments, or loss of fill. Holes may exist in walls or slabs. Integral wingwalls nearly severed from culvert. Severe scour or erosion at curtain walls, wingwalls or pipes.
2	Integral wingwalls collapsed, severe settlement of roadway due to loss of fill. Section of culvert may have failed and can no longer support embankment. Complete undermining at curtain walls and pipes. Corrective action required to maintain traffic.
1	Culvert closed – corrective action may put back in light service.
0	Culvert closed – replacement necessary.

Table 1678b Metal Culvert Condition Rating

WSBIS Code	Description
9	Not applicable. Structure is not a culvert.
8	No noticeable or noteworthy deficiencies which affect the condition of the culvert. Insignificant scrape marks caused by drift. Bolts are in good condition, in place and tight.
7	Insignificant damage caused by drift with no misalignment and not requiring corrective action. Some minor scouring has occurred near wingwalls or pipes. Smooth, symmetrical curvature with superficial corrosion and no pitting. Bolts may have superficial corrosion, are in place and tight.
6	Smooth curvature, non-symmetrical shape, and significant corrosion or moderate pitting. Bolts may have significant corrosion and 10 percent of the bolts in a panel seam may be missing or loose. Local minor scouring at wingwalls or pipes.
5	Minor settlement or misalignment. Noticeable scouring or erosion at wingwalls or pipes. Significant distortion and deflection in one section. Significant corrosion or deep pitting. Bolts may have significant corrosion and 20 percent of the bolts in a panel seam may be missing or loose.
4	Considerable settlement or misalignment. Considerable scouring or erosion at wingwalls or pipes. Significant distortion and deflection throughout. Extensive corrosion or deep pitting. Bolts may have extensive corrosion and 30 percent of the bolts in a panel seam may be missing or loose.
3	Any condition described in Code 4 but which is excessive in scope. Severe movement or differential settlement of the segments, or loss of fill. Wingwalls nearly severed from culvert. Severe scour or erosion at wingwalls or pipes. Extreme distortion and deflection in one section. Extensive corrosion or deep pitting with scattered perforations. Bolts may have extensive corrosion and 40 percent of the bolts in a panel seam may be missing or loose.
2	Wingwalls collapsed, severe settlement of roadway due to loss of fill. Section of culvert may have failed and can no longer support embankment. Complete undermining at curtain walls and pipes. Corrective action required to maintain traffic. Extreme distortion and deflection throughout with extensive perforations due to corrosion. Bolts may have extensive corrosion and 50 percent of the bolts in a panel seam may be missing or loose.
1	Culvert closed – corrective action may put back in light service.
0	Culvert closed – replacement necessary.

Table 1678c Timber Culvert Condition Rating

WSBIS Code	Description
9	Not applicable. Structure is not a culvert.
8	No noticeable or noteworthy deficiencies which affect the condition of the culvert. Insignificant scrape marks caused by drift.
7	Insignificant damage caused by drift with no misalignment and not requiring corrective action. Some minor scouring has occurred near curtain walls, wingwalls, Insignificant decay with no structural loss.
6	Minor deterioration or decay. All primary structural elements are sound. Local minor scouring at curtain walls or wingwalls.
5	Moderate deterioration or decay. All primary structural elements are sound but have some section loss. Minor settlement or misalignment. Noticeable scouring or erosion at curtain walls or wingwalls.
4	Major deterioration or decay. Considerable scour or erosion at curtain walls or wingwalls. Advanced section loss or scour that affects the load capacity of the structure. Considerable settlement or misalignment.
3	Any condition described in Code 4 but which is excessive in scope. Severe movement or differential settlement of the segments, or loss of fill. Wingwalls nearly severed from culvert. Severe scour or erosion at curtain walls or wingwalls. Extensive deterioration or decay. Advanced section loss or scour that significantly affects the load capacity of the culvert.
2	Severe deterioration or decay. Wingwalls collapsed, severe settlement of roadway due to loss of fill. Section of culvert may have failed and can no longer support embankment. Complete undermining at curtain walls. Corrective action required to maintain traffic. Critical structural members have obvious vertical or horizontal movement affecting structural stability.
1	Culvert closed – corrective action may put back in light service.
0	Culvert closed – replacement necessary.

WSBIS Item 1679 – Pier/Abutment Protection**Pulldown**

NBI Item 111

Applicable Structure Types

- Bridges & culverts carrying public roadways

If WSBIS Item 1386 – Navigation Control has been coded 1, use the codes 1 through 5 below to indicate the presence and adequacy of pier or abutment protection features such as fenders, dolphins, etc. The condition of the protection devices may be a factor in the overall evaluation of WSBIS Item 1676 – Substructure.

If WSBIS Item 1386 is coded 0, code N for this field.

Table 1679 Pier/Abutment Protection Rating

WSBIS Code	NBI Code	Description
1	1	Navigation protection not required
2	2	In place and functioning
3	3	In place but in a deteriorated condition
4	4	In place but reevaluation of design suggested
5	5	None present but reevaluation suggested
N	null	Not applicable, not a navigable waterway

NBI Commentary:

WSDOT codes N where the NBI codes a blank. This field is translated in the NBI text file.

WSBIS Item 1680 – Scour

Pulldown

NBI Item 113

Applicable Structure Types

- Bridges & culverts carrying public roadways

Code as indicated below to identify the current status of the bridge regarding its vulnerability to scour:

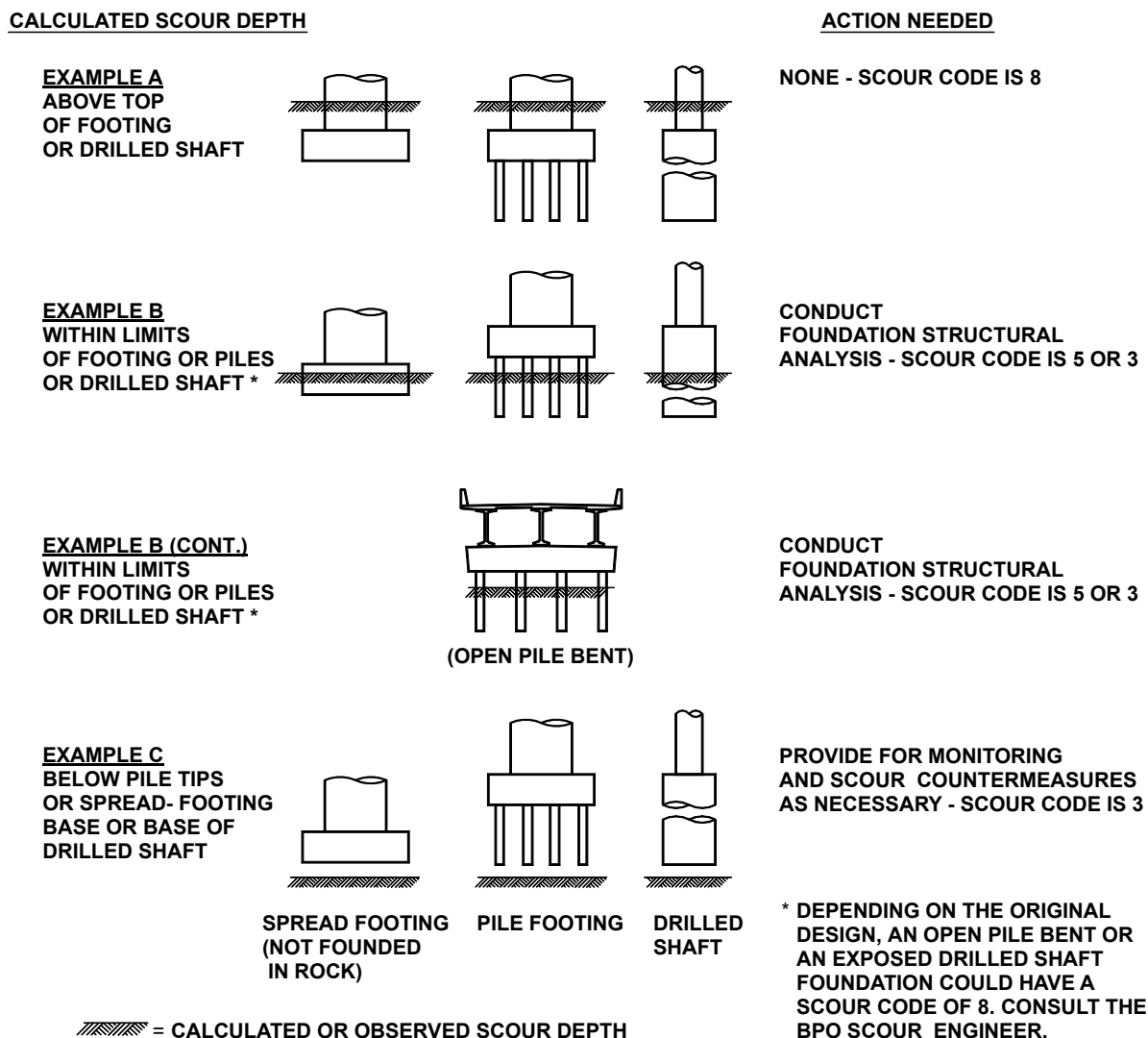
Table 1680 Scour Rating

WSBIS Code	Description
N	Bridge not over waterway.
U	Bridge with unknown foundation that has not been evaluated for scour. Until risk can be determined, a plan of action should be developed and implemented to reduce the risk to users from a bridge failure during or immediately after a flood event (see HEC 23).
T	Bridge over tidal waters that has not been evaluated for scour, but considered low risk. Bridge will be monitored with regular inspection cycle and with appropriate underwater inspections. (Unknown foundations in tidal waters should be coded U.)
9	Bridge foundations (including piles) on dry land well above flood water elevations.
8	Bridge foundations determined to be stable for the assessed or calculated scour conditions. Scour is determined to be above top of footing or drilled shaft (Example A) by: <ul style="list-style-type: none"> • assessment (e.g., bridge foundations are on rock formations that have been determined to resist scour within the service life of the bridge), or • calculation (exposed drilled shafts may be included by calculations), or • installation of properly designed countermeasures (see HEC 23).
7	Countermeasures have been installed to mitigate an existing problem with scour and to reduce the risk of bridge failure during a flood event. Instructions contained in a plan of action have been implemented to reduce the risk to users from a bridge failure during or immediately after a flood event.
6	Scour calculation/evaluation has not been made.
5	Bridge foundations determined to be stable for assessed or calculated scour conditions. Scour is determined to be within the limits of footing or piles, including open pile bents, or drilled shafts (Example B) by: <ul style="list-style-type: none"> • assessment (e.g., bridge foundations are on rock formations that have been determined to resist scour within the service life of the bridge), or • calculations, or • installation of properly designed countermeasures (see HEC 23).
4	Bridge foundations determined to be stable for assessed or calculated scour conditions; field review indicates action is required to protect exposed foundations (see HEC 23).
3	Bridge is scour critical; bridge foundations determined to be unstable for assessed or calculated scour conditions: <ul style="list-style-type: none"> • Scour within limits of footing or piles, or drilled shafts (Example B) • Scour below spread-footing base or pile tips, or base of shafts (Example C)
2	Bridge is scour critical; field review indicates that extensive scour has occurred at bridge foundations, which are determined to be unstable by: <ul style="list-style-type: none"> • a comparison of calculated scour and observed scour during the bridge inspection, or • an engineering evaluation of the observed scour condition reported by the bridge inspector in WSBIS Item 1676 – Substructure.
1	Bridge is scour critical; field review indicates that failure of piers/abutments is imminent. Bridge is closed to traffic. Failure is imminent based on: <ul style="list-style-type: none"> • a comparison of calculated and observed scour during the bridge inspection, or • an engineering evaluation of the observed scour condition reported by the bridge inspector in WSBIS Item 1676 – Substructure.
0	Bridge is scour critical. Bridge has failed and is closed to traffic.

These codes are generally determined based on scour analyses made by hydraulic, geotechnical, or structural engineers. However, bridge inspectors play a key role in determining selected scour codes:

- Scour code 4 can be determined by the bridge inspector regardless of any previous higher scour code, based on observed conditions.
- For scour codes of 2 or less, the WSBIS Item 1676 – Substructure code must have a matching code.
- For WSDOT bridges, all changes to the 1680 Scour Code must be reviewed and approved by the BPO Sour Engineer.

Figure WSBIS 1680



* DEPENDING ON THE ORIGINAL DESIGN, AN OPEN PILE BENT OR AN EXPOSED DRILLED SHAFT FOUNDATION COULD HAVE A SCOUR CODE OF 8. CONSULT THE BPO SCOUR ENGINEER.

NBI Commentary:

This item has been modified based on an April 27, 2001 FHWA memo regarding FHWA Items 60 and 113 (WSBIS Items 1676 and 1680). This memo is available at www.fhwa.dot.gov/engineering/hydraulics/policymemo/revguide.cfm.

Traffic Safety

WSBIS Items 1684, 1685, 1686, 1687

NBI Item 36A through D

Applicable Structure Types

- Bridges & culverts carrying public roadways

Bridge inspection shall include the recording of information on traffic safety features so that the evaluation of their adequacy can be made.

Use the following codes for each of the four traffic safety segments:

Table 6 Traffic Safety Feature Codes

WSBIS Code	Description
0	Inspected feature does not meet currently acceptable standards or a safety feature is required and none is provided.
1	Inspected feature meets currently acceptable standards.
N	Not applicable (structure does not carry traffic) or a safety feature is not required (see item description for requirements).

NBI Commentary:

WSDOT has applied state safety standards to determine how these fields are coded.

WSBIS Item 1684 – Bridge Rails

Pulldown

NBI Item 36A

Applicable Structure Types

- Bridges & culverts carrying public roadways

Bridge railings should be coded to reflect the current WSDOT standards. Refer to *Design Manual* Section 1610.07 Bridge Traffic Barriers.

Acceptable crash tested bridge rails fall into two general categories.

Thrie-beam Retrofit

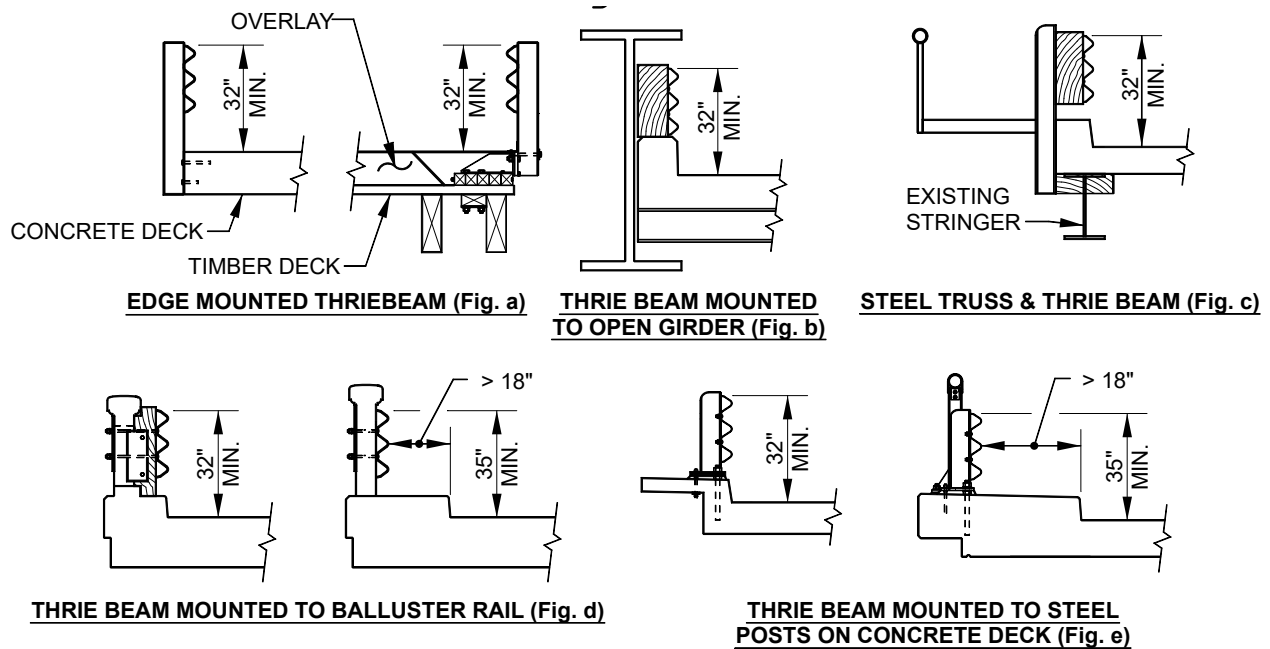
- Thrie-beam mounted to baluster rail
- Steel truss and Thrie-beam
- Edge mounted Thrie-beam
- Thrie-beam mounted to steel posts on concrete deck
- Thrie-beam mounted to open girder

Concrete Rail

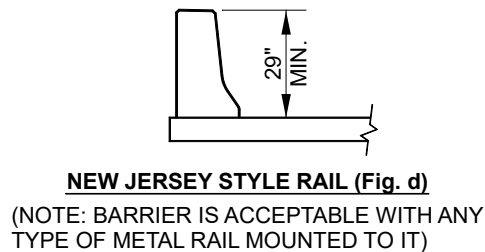
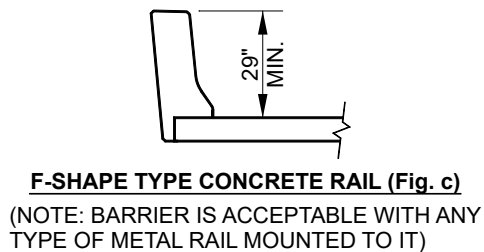
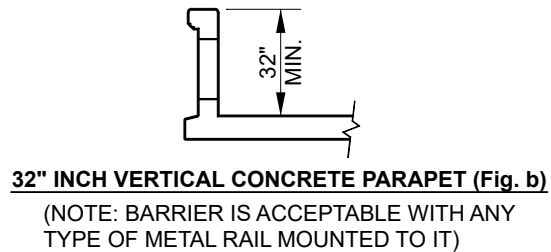
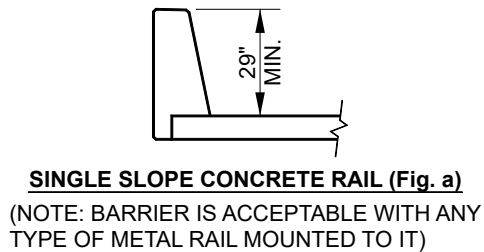
- New Jersey style rail
- F-shaped concrete rail
- Single slope concrete rail
- 32" vertical concrete parapet
- Type 7 concrete rail

Bridge rails are coded as N when there is sufficient roadway fill that there is no attachment to the structure.

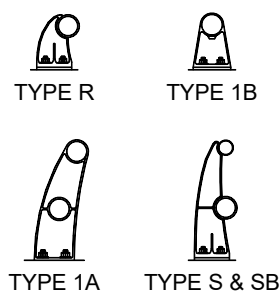
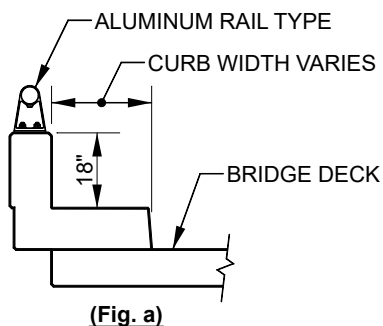
Figure WSBIS 1684



THRIE BEAM RETROFIT



CONCRETE RAIL



ALUMINUM RAIL TYPE	CURB WIDTH	
	9 INCHES OR LESS	GREATER THAN 9 INCHES
TYPE R, S, OR SB	CODE 1	CODE 1
TYPE 1B OR 1A	CODE 1	CODE 0

TYPE 7 BRIDGE RAIL

WSBIS Item 1685 – Transitions

Pulldown

Item 36B

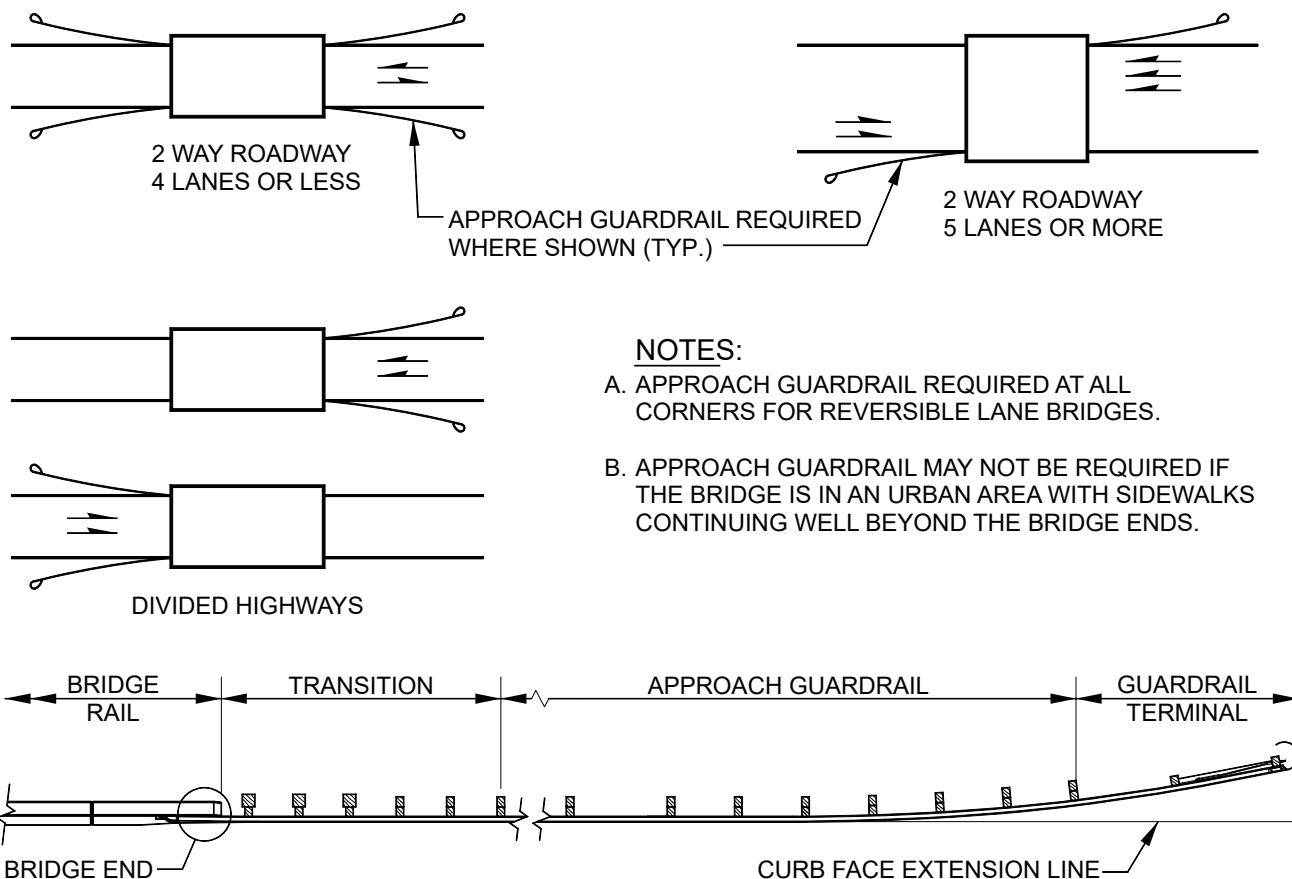
Applicable Structure Types

- Bridges & culverts carrying public roadways

Transition details are shown in WSDOT Standard Plans Section C. Features that the inspector should note are:

- If guardrails are not required, the absence of transitions is automatically acceptable and coded as 1.
- Transitions must be nested (two layers). In most cases this will be Thriebeam. W-beam is allowed only when there is insufficient bridge rail height to accommodate the Thrie-beam transition, for example Type 7 bridge rail.
- Post spacing should decrease in the transition resulting in gradual stiffening as a vehicle moves along the transition from a flexible guardrail to the more rigid concrete bridge rail.
- Type III transitions (hollow steel post) have generally been retrofitted, but are only acceptable if they have been retrofitted with a block out less than or equal to 1' – 6" from rail to anchor. On oneway highways, the non-retrofitted posts are acceptable on the trailing edge. Unless further investigation shows that it meets current standards, this is the criteria for acceptance that will be used.
- Transitions are coded as N when there is sufficient roadway fill that there is no attachment to the structure.

Figure WSBIS 1685



WSBIS Item 1686 – Guardrails**Pulldown**

Item 36C

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

W-beam and Thrie-beam are acceptable rail types. Details of these rails are shown in Standard Plans Section C. Features that the inspector should pay close attention to while inspecting the approach rail are:

- Rails are not necessarily required at all four corners of the bridge. Code Guardrails as 1 when not required.
- Posts should be 6" × 8" timber (nominal), or W6x9's, spaced at 6' 3" o.c. Nested Thrie-beam is also acceptable but requires lower post spacing.
- Guardrail height (from ground to top of W-beam) should be between 26" and 28".
- Guardrail height (from ground to top of Thrie-beam) should be 32".
- Concrete rail is acceptable.

WSBIS Item 1687 – Terminals**Pulldown**

Item 36D

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- Terminals are to be coded as 1 or 0 if they are within a reasonable distance of the bridge. On a fill embankment, this would be near the bottom of the fill slope (*Design Manual M 22-01*). Otherwise they will be coded as an N.
- If guardrails are not required, the absence of terminals is automatically acceptable and coded as 1.
- Acceptable guardrail terminals are shown in the Washington State *Standard Plans* Section C or *Design Manual M 22-01*.

Miscellaneous Fields**WSBIS Item 2610 – Asphalt Depth (inches)** N(5,2)**Applicable Structure Types**

- Bridges & culverts carrying public roadways

Code the average depth of asphalt in inches on the deck as observed from field measurements, or as determined from comparing the design curb height against the measured curb height from the top of asphalt. In cases where there is ballast, such as on timber decks, enter the full thickness of ballast and asphalt.

Code 0 when:

There is no asphalt on the deck.

When the structure does not have a deck, including when asphalt pavement is placed on fill over a culvert. In cases where there is ballast, such as on timber decks, enter the full thickness of ballast and asphalt.

WSBIS Item 2611 – Design Curb Height (inches) N(5,2)**Applicable Structure Types**

- Bridges & culverts carrying public roadways

Code the curb height shown on current bridge plans in inches. Code 0 when there is no curb.

WSBIS Item 2612 – Bridge Vehicle Rail Height (inches) N(5,2)**Applicable Structure Types**

- Bridges & culverts carrying public roadways

Code the vehicle rail height as measured in the field, from the top of the rail system to the bridge deck.

WSBIS Item 2675 – Number of Utilities Pulldown**Applicable Structure Types**

- Bridges & culverts carrying public roadways

This field indicates the number of franchise utilities attached to the bridge. Utilities include, but are not limited to, water pipes, sewer lines, telephone lines, power lines, and gas lines. Conduit for electricity used on the bridge is not considered a utility. A conduit cluster (e.g., a telephone cluster) is considered one utility. This field is not used to evaluate the condition of utilities on the bridge, only the number of utilities present. If more than nine utilities are attached to the bridge, code 9. If there are no utilities, code 0.

WSBIS Item 2614 – Subject to NBIS Flag**Pulldown****Applicable Structure Types**

- All structure records

This field identifies whether or not the bridge is subject to the National Bridge Inspection Standards (NBIS).

- Y Bridge is subject to the NBIS
- N Bridge is not subject to the NBIS.

This field is based on 23 CFR 650.305, found at www.fhwa.dot.gov/legregs/directives/fapg/cfr0650c.htm, and the Questions and Answers paragraphs Q303-1 through Q303-6, found at www.fhwa.dot.gov/bridge/nbis/index.cfm. Structures subject to the NBIS include all publicly owned highway structures carrying public roads over a depression or obstruction and having an opening measured along the center of the roadway of more than 20 feet between one of the following:

- Undercopings of abutments
- Spring lines of arches
- Extreme ends of openings for multiple box culverts
- Extreme ends of openings for multiple pipe culverts where the clear distance between pipes is less than half of the smaller contiguous pipe

Structures not subject to the NBIS include:

- Sign support structures
- High mast lighting
- Retaining walls
- Noise barrier structures
- Overhead traffic signs
- Tunnels
- Structures carrying only pedestrians
- Structures carrying only railroad

Ownership and access are also important factors. To be subject to the NBIS, a structure must be both publicly owned and publicly accessible. Structures not subject to the NBIS include:

- Privately owned structures accessible to the public (e.g., road association structures)
- Publicly owned bridges that are not accessible to the public (e.g., structures behind gates used to access dams for agency employees and contractors)

Inspection Flags

WSBIS Item 2688 – Revise Rating Flag	Pulldown
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Applicable Structure Types

- Bridges & culverts carrying public roadways
- Tunnels carrying public roadways within

This code indicates whether or not the structure should be reviewed for a revised rating based on field conditions. A note shall be added by the inspector identifying the reason/condition that prompts reevaluation of the load rating.

- Y Yes, review rating
- * Null field, rating review is not required

See Section 5-2.

WSBIS Item 2691 – Photos Flag	Pulldown
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Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

This code indicates whether or not the structure needs photos taken.

- D Deck photo needed
- E Elevation or tunnel portal photo needed
- P Deck and Elevation photos needed
- * Null field, photos are not required

WSBIS Item 2693 – Soundings Flag	Pulldown
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This code indicates whether or not soundings of the streambed (streambed cross sections at the bridge) are required.

- Y Soundings need to be taken.
- * Null field, soundings are not required

This field is coded as part of the inspection planning process, and instructs the inspector to take soundings. When soundings are taken, the flag should be changed to null.

Note: Pedestrian bridges over waterways are managed for soundings and may be coded Y as appropriate.

WSBIS Item 2694 – Clearance Flag	Pulldown
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Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

This field indicates that an inspection team should collect clearance data.

- C Measure horizontal/lateral and vertical clearances.
 * Null field, measurements are not required, or were just collected.

This field is coded as part of the inspection planning process, and instructs the inspector to collect and record clearance measurements in accordance with WSDOT policy (see Chapter 3) and as indicated in the 2694 inspection note. Note that all vertical clearances in, on and under the structure need to be collected unless otherwise noted.

After measurements are collected and documents given to a Geometric Engineer for processing, change this code from C to * (null).

WSBIS Item 2695 – QA Flag	Pulldown
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Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

This code indicates whether or not a quality assurance report was created for this structure.

- Y Quality assurance report on file.
 * Null field

Local Agency Appraisals

WSBIS Item 7664 – Drain Condition

Pulldown

Applicable Structure Types

- Bridges & culverts carrying public roadways

This is the condition rating of the drains in the bridge deck. A rating of 5 should be used to indicate the drains are completely plugged with dirt and debris. Use Table WB76-64 Condition Rating for Secondary Bridge Members (Drains).

Table WB76-64 Condition Rating for Secondary Bridge Members (Drains)

WSBIS Code	Description
9	Not Applicable.
8	Very Good Condition. No problems noted.
7	Good Condition. Some minor problems.
6	Satisfactory Condition. Structural elements show some minor deterioration.
5	Fair Condition. All primary structural elements are sound but may have deficiencies such as minor section loss, deterioration, cracking, spalling, or scour.
4	Poor Condition. Advanced deficiencies such as section loss, deterioration, cracking, spalling, or scour.

WSBIS Item 7665 – Drain Status

Pulldown

Applicable Structure Types

- Bridges & culverts carrying public roadways

This code describes the present status of the drains on the bridge.

Table WB76-65

WSBIS Code	Description
9	Drains status is unknown
4	Drains have been disconnected
3	Drains have been replaced by another type
2	Drains have been permanently blocked
1	Drains exist as built
0	Drains do not exist

WSBIS Item 7666 – Deck Scaling**Pulldown****Applicable Structure Types**

- Bridges & culverts carrying public roadways

This code describes the severity of any deck scaling present.

The amount and type of deterioration present in the top surface of concrete bridge decks is to be rated. If the bridge does not have a concrete deck (for example, it has an asphalt overlay or a steel or timber deck), code N.

- N None
- L Light (scaling up to ¼" deep)
- M Moderate (scaling up to ½" deep)
- H Heavy (scaling or spalls up to 1" deep)
- S Severe (over 1" deep)

WSBIS Item 7667 – Deck Scaling Percent**N(2,0)****Applicable Structure Types**

- Bridges & culverts carrying public roadways

This value is the percentage of the total deck area where scaling and/or spalling are present. It includes any areas which have been patched.

In scaled areas of more than 1 percent, estimate the percentage at 5 percent increments. The amount and type of deterioration present in the top surface of concrete bridge decks is to be calculated. If the bridge does not have a concrete deck (for example, it has an asphalt overlay or a steel or timber deck), code 00.

WSBIS Item 7669 – Deck Rutting**Pulldown****Applicable Structure Types**

- Bridges & culverts carrying public roadways

The amount and type of deterioration present in the top surface of concrete bridge decks is to be rated using the following codes. If the bridge does not have a concrete deck (i.e., it has an asphalt overlay or a steel or timber deck), code 0.

Table WB76-69

WSBIS Code	Description
8	No wear
7	Exposed aggregate
5	Visible wheel track rutting
3	Wheel track rutting has exposed reinforcing steel
0	Not applicable

WSBIS Item 7670 – Deck Exposed Rebar**Pulldown****Applicable Structure Types**

- Bridges & culverts carrying public roadways

This code describes the degree to which the deck area shows exposed reinforcing steel.

The amount and type of deterioration present in the top surface of concrete bridge decks is to be rated. If the bridge does not have a concrete deck (for example, it has an asphalt overlay or a steel or timber deck), code 0.

Table WB76-70

WSBIS Code	Description
8	None
7	Some cracking in deck over reinforcing steel
5	0 to 5 percent of deck area shows exposed reinforcing steel
3	More than 5 percent of deck area shows exposed reinforcing steel
0	Not applicable

WSBIS Item 7672 – Curb Condition**Pulldown****Applicable Structure Types**

- Bridges & culverts carrying public roadways

This is the condition rating of any curbs located on the bridge. Use Table WB7672 Condition Rating for Secondary Bridge Members (Curbs).

Table WB76-72 Condition Rating for Secondary Bridge Members (Curbs)

WSBIS Code	Description
9	Not Applicable.
8	Very Good Condition. No problems noted.
7	Good Condition. Some minor problems.
6	Satisfactory Condition. Structural elements show some minor deterioration.
5	Fair Condition. All primary structural elements are sound but may have deficiencies such as minor section loss, deterioration, cracking, spalling, or scour.
4	Poor Condition. Advanced deficiencies such as section loss, deterioration, cracking, spalling, or scour.

WSBIS Item 7673 – Sidewalk Condition**Pulldown****Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

This is the condition rating of any sidewalks which are an integral part of or are attached to the bridge. This rating considers the condition of any structural members (i.e., stringers) which may support the sidewalk.

To be considered a sidewalk, the member must be greater than or equal to three feet in width. Use Table WB76-73 Condition Rating for Secondary Bridge Members (Sidewalk).

Table WB76-73 Condition Rating for Secondary Bridge Members (Sidewalk)

WSBIS Code	Description
9	Not Applicable.
8	Very Good Condition. No problems noted.
7	Good Condition. Some minor problems.
6	Satisfactory Condition. Structural elements show some minor deterioration.
5	Fair Condition. All primary structural elements are sound but may have deficiencies such as minor section loss, deterioration, cracking, spalling, or scour.
4	Poor Condition. Advanced deficiencies such as section loss, deterioration, cracking or spalling.

WSBIS Item 7674 – Paint Condition**Pulldown****Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

This field contains the condition rating of any paint applied to the bridge to protect the primary structural steel members.

If paint has been applied only on secondary members such as bridge rails or light posts, code 9 in this field.

Table Number Title

WSBIS Code	Description
9	Not applicable.
8	Bridge has recently been painted.
7	Paint is in good condition with only minor weathering.
6	Bridge needs to be painted within five years.
5	Bridge needs to be painted within three years.
4	Bridge needs to be painted within two years.

A paint code of '5' or '4' needs to have at least one paint inspection form completed as part of the inspection report in the bridge file. The bridge is also a candidate for paint testing.

WSBIS Item 7681 – Approach Condition**Pulldown****Applicable Structure Types**

- Bridges & culverts carrying public roadways

This is the general physical condition rating of the approach roadway. This evaluation takes into consideration visible signs of wear, cracking, spalling, etc., but does not consider the alignment or width of this roadway.

Table Number Title

WSBIS Code	Description
9	Not applicable.
8	Smooth approach onto the bridge structure.
6	Less than 1" of settlement of the approach roadway causing minor bouncing and load impact onto the bridge. Monitor the settlement.
3	More than 1" of settlement of the approach roadway causing bouncing and load impact onto the bridge. Needs to be ACP feather repaired to provide a smooth transition onto the bridge.

Note: Code 6 for well maintained gravel roads. Code 3 for gravel roads in rough condition.

WSBIS Item 7682 – Retaining Wall Condition**Pulldown****Applicable Structure Types**

- Bridges & culverts carrying public roadways

This field contains the general condition rating of any retaining walls associated with the bridge. This evaluation should take into consideration whether movement, cracking, or settling has occurred.

Wingwalls and curtain walls should not be considered under this code as they are considered part of the abutment. Use Table WB76-82 Condition Rating for Retaining Walls.

Table WB76-82 Condition Rating for Retaining Walls

WSBIS Code	Description
9	Not Applicable.
8	Very Good Condition. No problems noted.
7	Good Condition. Some minor problems.
6	Satisfactory Condition. Structural elements show some minor deterioration.
5	Fair Condition. All primary structural elements are sound but may have deficiencies such as minor section loss, deterioration, cracking, spalling, or scour.
4	Poor Condition. Advanced deficiencies such as section loss, deterioration, cracking, spalling, or scour.
3	Serious Condition. Loss of section, deterioration, spalling, or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present.
2	Critical Condition. Advanced deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete maybe present or scour may have removed substructure support. Unless closely monitored, it may be necessary to close the bridge until corrective action is taken.
1	Imminent Failure Condition. Major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic but corrective action may put back in light service.
0	Failed Condition. Out of service. Beyond corrective action.

WSBIS Item 7683 – Pier Protection Condition**Pulldown****Applicable Structure Types**

- **Bridges & culverts carrying public roadways**

This rating describes the general condition rating of any pier and/or abutment protection features (i.e., fenders and dolphins) which have been put in place to protect the bridge against collisions from vessels or objects in tow.

This field is used for rating the general condition of the bridge's pier protection features and does not evaluate the adequacy of those features.

If no pier protection exists, code 9. Use Table WB76-83 Condition Rating for Secondary Bridge Members (Pier Protection).

Table WB76-83 Condition Rating for Secondary Bridge Members (Pier Protection)

WSBIS Code	Description
9	Not Applicable.
8	Very Good Condition. No problems noted.
7	Good Condition. Some minor problems.
6	Satisfactory Condition. Structural elements show some minor deterioration.
5	Fair Condition. All primary structural elements are sound but may have deficiencies such as minor section loss, deterioration, cracking, spalling, or scour.
4	Poor Condition. Advanced deficiencies such as section loss, deterioration, cracking, spalling, or scour.

WSBIS Item 7710 – Sufficiency Rating**Calculated****Applicable Structure Types**

- **Local Agency Bridges & culverts carrying public roadways**

This item is calculated automatically and cannot be edited, and applies only to local agency bridges and culverts.

The Sufficiency Rating (SR) formula provides a method of evaluating highway bridge data by calculating four separate factors to obtain a numeric value which is indicative of bridge sufficiency to remain in service. The result of this method is a percentage in which 100 percent would represent an entirely sufficient bridge and zero percent would represent an entirely insufficient or deficient bridge. The formula considers the structural adequacy, functional obsolescence, level of service and essentiality for public use.

See Appendix 2-G for the Sufficiency Rating formula.

WSBIS Item 7711 – Structurally Deficient/Functionally Obsolete**Calculated****Applicable Structure Types**

- **Local Agency Bridges & culverts carrying public roadways**

This item is calculated automatically and cannot be edited, and applies only to local agency bridges and culverts.

Bridges are considered Structurally Deficient (SD) if significant load carrying elements are found to be in poor condition due to deterioration and/or damage, or the adequacy of the waterway opening provided by the bridge is determined to be extremely insufficient to the point of causing overtopping with intolerable traffic interruptions.

SD is numerically defined as follows:

- A bridge component (deck, superstructure, substructure or culvert) having a condition rating of 4 or less (poor condition).
- or
- Structural Evaluation or Waterway Adequacy rated 2 or less (a bridge with a very low load rating capacity, or a bridge that is subject to overtopping with significant or severe traffic delays).

For a structure to be considered SD, one of the following items must be true:

Table 7711a Structurally Deficient Guide

WSBIS Item	Condition/Appraisal Rating
1657 – Structural Evaluation	≤ 2
1662 – Waterway Adequacy	≤ 2
1663 – Deck	≤ 4
1671 – Superstructure	≤ 4
1676 – Substructure	≤ 4
1678 – Culvert	≤ 4

Bridges are considered Functionally Obsolete (FO) when the deck geometry, load carrying capacity (comparison of the original design load to the current State legal load), clearance or approach roadway alignment no longer meet the usual criteria for the system of which it is an integral part. In general, FO means that the bridge was built to standards that are not used today. Examples of characteristics leading to an FO classification:

- Low load carrying capacity
- Low waterway adequacy
- Deck geometry (insufficient deck roadway width)
- Insufficient horizontal and vertical clearances
- Poor approach roadway alignment

For a structure to be considered FO, one of the following items must be true:

Table 7711b Functionally Obsolete Guide

WSBIS Item	Appraisal Rating
1657 – Structural Evaluation	3
1658 – Deck Geometry	≤ 3
1659 – Underclearances	≤ 3
1661 – Approach Roadway Alignment	≤ 3
1662 – Waterway Adequacy	3

Bridge ID Tab

WSBIS Item 1001 – Structure Identifier	AN(8)
NBI Item 8	
NTI Item I.1	

Applicable Structure Types

- All structure records

This field must be unique for every structure in the Washington State Bridge Inventory, and cannot change for the life of the structure. Furthermore, when a new structure replaces an old structure, a new unique structure identifier must be coded. The old identifier cannot be recycled.

The BPO and LP Data Stewards assign the structure identifier when the original structure inventory record is processed. When initially creating a new structure in BridgeWorks, a temporary structure ID is generated with an X as the first character. This temporary structure ID will be changed when the record is “released” into the database.

NBI and NTI Commentary:

This field is translated to the NBI by adding 7 zeroes to the end of the 8-digit WSBIS code. This translation is done automatically with the generation of the NBI text file and NTI xml file. The NBI coding guide states that all structures with a closed median should be considered one structure, not two, presumably even in cases when they are actually structurally distinct. In some instances WSDOT has coded these structures separately.

WSBIS Item 2009 – Bridge Number	AN(13)
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Applicable Structure Types

- All structure records

This is a unique (to the owner agency) alphanumeric code assigned by the owner of the structure. This field does not require all spaces to be filled; however, the field cannot be left blank.

WSDOT owned structure numbers are formatted as follows:

[route number] / [alphanumeric character string]

WSDOT structure numbers follow several rules:

1. The forward slash (/) is always in the 4th position, with leading blanks as needed. For example, structure on I-5 are coded with two leading blanks followed by a 5 and a forward slash. Structure on US 395 have no leading blanks.
2. In general, every structure must have a unique structure number. The exception is when structures are replaced the structure number usually doesn't change. In this case, the obsoleted structure will have the same structure number.
3. The alphanumeric character string following the forward slash is numerically sequenced by increasing route milepoint, and is often followed by letter characters:

Characters providing route-related information:

E	east structure of a pair on a divided south-north route
W	west structure of a pair on a divided south-north route
N	north structure of a pair on a divided west-east route

S	south structure of a pair on a divided west-east route
E-N	ramp carrying from eastbound to northbound (vary as needed)
ECD	eastbound collector distributor (vary as needed)
A	structure not on mainline
F	structure on frontage road
ALT	structure on alternate route mainline
SP	structure on spur route

Characters providing structure design type information:

C	culvert
P	pedestrian bridge
DV	detention vault
LID	structure intended to reconnect severed residential areas

Examples:

90/43S	Eastbound I-90 bridge at Mercer Slough in South Bellevue
5/26N-N	Ramp carrying northbound I-5 traffic to northbound 139th St.
5/313P	Pedestrian bridge over I-5 in Tumwater

- Short span structure numbers are followed by a decimal point and a two digit number, e.g. 5/300.25.
- The second portion of WSDOT structure numbers range from 1 to 99 within the first county in which the route occurs, 100 to 199 in the second county, 200 to 299 in the third county, and so on.

WSBIS Item 2010 – Bridge Sort Number

AN(20)

Applicable Structure Types

- All structure records

This field is used for sorting structure numbers within the application and in various database queries. This field is maintained for tunnels and culverts.

The Structure Sort Number uses three digits for the route number and three digits for the structure number, with leading zeroes as necessary. Any following alpha characters are included. A total of 20 characters can be used.

When a decimal place is used in the Structure number, the character z is used in the structure sort number. This facilitates correct sorting.

Many local agency Structure Sort Numbers begin with a 99 and a space.

Examples:

Structure Number	Structure Sort Number
97/140W	097140W
97/285.6C	097285z6C
5/344S-E	005344S-E
241/2	241002
1135-2	99 1135-2

For state owned structures, this item is coded by the BPO Information Group and is visible in the BridgeWorks Inventory Management mode.

WSBIS Item 1132 – Bridge Name**AN(50)**

NTI Item I.2

Applicable Structure Types

- **All structure records**

This is the name of the structure, either as determined by legislative action or as determined by the structure owner. If the structure name is more than one word, separate words with a blank space. If the name of the structure exceeds the 50 character limit, use abbreviations to shorten it.

WSBIS Item 1232 – Features Intersected**AN(24)**

NBI Item 6

Applicable Structure Types

- **All structure records**

This item contains a description of the features intersected by the structure. When the structure is a bridge, the feature will always describe something under the bridge. When the structure is a tunnel, it will always describe something on top of the tunnel. The data in this segment shall be left justified and is limited to 24 characters. When one of the features intersected is another highway, the signed number or name of the highway shall appear first in the field. The names of any other features shall follow, separated by a comma.

Examples:

SR 99, BLUE R, RR
I-405 N-E & N-W RAMPS
GOOSE CREEK
SR 524 SPUR/44TH AVE W
TERRAIN

NBI Commentary:

The NBI coding guide separates this field into two segments (6A with 24 characters and 6B with 1 character). However, it's also stated that 6B is not used. The WSBIS coding guide eliminates any reference to 6B, but a blank space is created automatically in the NBI text file.

WSBIS Item 1256 – Facilities Carried**AN(18)**

NBI Item 7

NTI Item I.10

Applicable Structure Types

- **All structure records**

The facility being carried by the structure shall be recorded and coded. For all bridges this item describes the use on the structure, and for all tunnels this describes the use in the tunnel. This item shall be left justified and is limited to 18 characters.

Examples:

US 12
RAILROAD
MAIN STREET
PEDESTRIANS
ISRAEL RD

WSBIS Item 1156 – Location **AN(25)**

NBI Item 9

Applicable Structure Types

- All structure records

This item contains a narrative description of the structure location for the inventory route. Descriptions should be oriented ahead on station whenever possible. Do not use city limits, as these boundaries may move. This item shall be left justified.

Examples:

19.3 E JCT SR 203

14.7 E MASON CO

WSBIS Item 2400 – Program Manager **Pulldown**

Applicable Structure Types

- All structure records

This field identifies the individual responsible for bridge and tunnel inspection and reporting as described in the National Bridge Inspection Standards Title 23 CFR 650.307 and the National Tunnel Inspection Standards Title 23 CFR 650. 507. Both the NBI/NTI program manager and delegated program managers are listed in this field as appropriate.

In cases when the bridge is not subject to the NBIS or NTIS, this field identifies who is responsible for inspecting the structure and maintaining the structure records in accordance with WSDOT policies.

WSBIS Item 1286 – Custodian **Pulldown**

NBI Item 21

NTI Item C.2

WSBIS Item 1019 – Owner **Pulldown**

NBI Item 22

NTI Item C.1

Applicable Structure Types

- All structure records

The actual name of the owner and custodian of the structure shall be recorded on the inspection form. In most cases the owner and custodian will be the same agency, but if they are different the two agencies should have an agreement. This agreement should be part of the bridge record if it's available. If more than one agency has equal ownership or shares custodianship, code one agency in the hierarchy of State, Federal, county, city, railroad, and other private.

Table 1019 Owner and Custodian Codes

WSBIS Code	NBI Code	NTI Code	Description
1	001	001	State Highway Agency
2	002	002	County Highway Agency
4	004	004	City or Municipal Highway Agency
11	011	011	State Park, Forest, or Reservation Agency
12	012	012	County Park, Forest, or Reservation Agency
13	012	012	City Park, Forest, or Reservation Agency
21	021	021	Other State Agencies
22	001	001	Washington State Ferries
24	025	025	Other County Agency
25	025	025	Other City or Local Agencies
26	026	026	Private (other than railroad)
27	027	027	Railroad
28	027	027	Light Rail
31	031	031	State Toll Authority
32	032	032	County Toll Authority
33	032	032	City or Other Toll Authority
60	060	060	Other Federal Agencies (not listed below)
61	061	061	Indian Tribal Government
62	062	062	Bureau of Indian Affairs
63	063	063	Bureau of Fish and Wildlife
64	064	064	U.S. Forest Service
66	066	066	National Park Service
68	068	068	Bureau of Land Management
69	069	069	Bureau of Reclamation
70	070	070	Corps of Engineers (Civil)
71	071	070	Corps of Engineers (Military)
72	072	072	Air Force
73	073	073	Navy/Marines
74	074	074	Army
80	080	080	Unknown
92	001	001	Idaho maintenance responsibility
93	001	001	Oregon maintenance responsibility

NBI and NTI Commentary:

Selected codes have been eliminated because they are not used by any structures in Washington State (NSA, Pentagon, etc.). Selected codes were added, generally to differentiate county agencies from other local agencies, provide a unique code for Washington State Ferries, and codes for Oregon and Idaho border bridges maintained by these other state agencies.

WSBIS Item 1021 – County Code

Pulldown

NBI Item 3

NTI Item I.4

Applicable Structure Types

- All structure records

This code identifies the county in which the structure is located. If this is a jointly owned structure, the county that is responsible for reporting the data to the inventory should be entered here. For WSDOT structures, the county at the beginning of bridge is coded.

A map of county limits is available at ww.wsdot.wa.gov/data/tools/geoportal.

Table 1021 County Codes

WSBIS Code	NBI/NTI Code	County Name	WSBIS Code	NBI/NTI Code	County Name
1	001	Adams	21	041	Lewis
2	003	Asotin	22	043	Lincoln
3	005	Benton	23	045	Mason
4	007	Chelan	24	047	Okanogan
5	009	Clallam	25	049	Pacific
6	011	Clark	26	051	Pend Oreille
7	013	Columbia	27	053	Pierce
8	015	Cowlitz	28	055	San Juan
9	017	Douglas	29	057	Skagit
10	019	Ferry	30	059	Skamania
11	021	Franklin	31	061	Snohomish
12	023	Garfield	32	063	Spokane
13	025	Grant	33	065	Stevens
14	027	Grays Harbor	34	067	Thurston
15	029	Island	35	069	Wahkiakum
16	031	Jefferson	36	071	Walla Walla
17	033	King	37	073	Whatcom
18	035	Kitsap	38	075	Whitman
19	037	Kittitas	39	077	Yakima
20	039	Klickitat			

NBI and NTI Commentary:

The WSBIS county code is translated to the NBI county code using the formula (WSBIS Code x 2) – 1 = NBI code and as shown above.

WSBIS Item 2023 – City**Pulldown****Applicable Structure Types**

- All structure records

This is the 1990 federal census place code, updated by OFM. .

If the bridge is not in a city, code 0 - Unincorporated.

A map of city limits is available at www.wsdot.wa.gov/data/tools/geoportal.

WSBIS Item 1274 – Region Code**Pulldown**

NBI Item 2

NTI Item I.6

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

This is the WSDOT region in which the bridge is located.

Table 1274 Region Code

WSBIS Code	NBI Code	NTI Code	Region Name
NW	1	NW	Northwest Region
NC	2	NC	North Central Region
OL	3	OL	Olympic Region
SW	4	SW	Southwest Region
SC	5	SC	South Central Region
EA	6	EA	Eastern Region

A region boundary map can be found at www.wsdot.wa.gov/mapsdata/products/digitalmapsdata.htm.

NBI and NTI Commentary:

This field is translated as shown in the table above for the NBI, but is not translated for the NTI.

WSBIS Item 1188 – Latitude	(XX degrees XX minutes XX.XX seconds)
NBI Item 16	
NTI Item I.13	
WSBIS Item 1196 – Longitude	(XXX degrees XX minutes XX.XX seconds)
NBI Item 17	
NTI Item I.14	

Applicable Structure Types

- **All structure records**

Code the latitude and longitude in degrees, minutes and seconds to the nearest hundredth of a second using the NAD 83/91 - North American Datum of 1983, with 1991 adjustments. Note that true longitudes are a negative number at all locations in Washington State, but when coded in WSBIS a positive number is used.

Accurate data can be acquired using internet resources such as Google Maps or Bing Maps.

For bridges and culverts carrying public roadways, the reading should be taken at the beginning of the structure at centerline. When the inventory route has a Linear Referencing System (LRS) designation, the beginning of the structure is the lower milepoint for the LRS route.

For pedestrian, RR and other non-vehicular structures over public roadways, the reading should be taken at the centerline of the roadway under the bridge.

For tunnels carrying public roadways within, the reading should be taken at the beginning of the tunnel portal at the centerline.

WSBIS Item 2181 – Section	N(2)
WSBIS Item 2183 – Township	N(2)
WSBIS Item 2185 – Range	N(3)

Applicable Structure Types

- All structure records

Section, township, and range numbers are location markers established by survey mapping. If the structure runs along a section, township, or range line, use the smaller of the two numbers. If a structure crosses any line, use the number at the beginning of the structure.

WSBIS Item 2181 – Section

This is the number of the section in which the structure is located. Enter a numeric code from 01 to 36.

WSBIS Item 2183 – Township

This is the number of the township in which the structure is located. Enter a numeric code from 01 to 41. Township designations carry a directional suffix (north or south); however, since all townships in Washington are north, this directional indicator need not be entered.

WSBIS Item 2185 – Range

This is the number of the range in which this structure is located. There are two parts to this field. In the first two places, enter the number of the range in which the structure is located. Valid ranges are:

- 01 through 47 if the third column is E
- 01 through 16 If the third column is W.

In the third place, enter the directional suffix which indicates the position of the range in relation to the Willamette Meridian. Enter one of the following codes:

- E East
- W West

A map of section, township and range information is available at www.wsdot.wa.gov/data/tools/geoportal.

WSBIS Item 1276 – Federal Information Processing Standards (FIPS) Code	AN(5)
NBI Item 4	
NTI Item I.5	

Applicable Structure Types

- All structure records

Code all zeroes for this 5-digit field.

NBI and NTI Commentary:

Federal Information Processing Standards were withdrawn by the National Institute of Standards and Technology on January 1, 2006, with the intent to replace them with the Geographic Names Information System (GNIS). On this basis, WSDOT has chosen not to maintain FIPS codes. See the following links for more information:

- http://geonames.usgs.gov/docs/fips55_change.pdf
- <http://nhd.usgs.gov/gnis.html>

WSBIS Item 1285 – Toll

Pulldown

FHWA Item 20 – Toll

NTI Item C.4 - Toll

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

The toll status of the structure is indicated by this item. Interstate toll segments under Secretarial Agreement (Title 23 - United States Code - Highways Section 129 as amended by 1991 ISTEA and prior legislation) shall be identified separately. Use one of the following codes:

Table 1285 Toll Code

WSBIS Code	NBI Code	NTI Code	Description
1	1	1	Toll bridge. Tolls are paid specifically to use the structure.
2	2	2	On toll road. The structure carries a toll road, that is, tolls are paid to use the facility, which includes both the highway and the structure.
3	3	0	On free road. The structure is tollfree and carries a tollfree highway.
4	4	2	On Interstate toll segment under Secretarial Agreement. Structure functions as a part of the toll segment.
5	5	2	Toll bridge is a segment under Secretarial Agreement. Structure is separate agreement from highway segment.

NTI Commentary:

Toll codes translated for the NTI as shown in the table above.

WSBIS Item 1288 – Parallel Structure

Pulldown

NBI Item 101

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways

Code this item to indicate situations where separate structures carry the inventory route in opposite directions of travel over the same feature. The lateral distance between structures has no bearing on the coding of this item.

For pedestrian, railroad and other non-vehicular structures over public roadways, always code N.

One of the following codes shall be used:

Table 1288 Parallel Structure Code

WSBIS Code	Description
R	The right structure of parallel bridges carrying traffic in the direction of increasing mileposts.
L	The left structure of parallel bridges carrying traffic in the direction of decreasing mileposts.
N	No parallel structure exists; OR pedestrian, railroad or other non-vehicular structure over public roadway.

WSBIS Item 1289 – Temporary Structure**Pulldown**

NBI Item 103

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways

Code this item to indicate situations where a temporary structure or conditions exist.

Table 1289 Temporary Structure Code

WSBIS Code	Description
T	Temporary structure or conditions exist.
null	No temporary structure or conditions

A temporary structure or conditions are those which are required to facilitate traffic flow. This may occur either before or during the modification or replacement of a structure found to be deficient. Such conditions include the following:

- Bridges shored up, including additional temporary supports.
- Temporary repairs made to keep a bridge open.
- Temporary structures, temporary runarounds or bypasses.
- Other temporary measures, such as barricaded traffic lanes to keep the bridge open.

Any repaired structure or replacement structure which is expected to remain in place without further project activity, other than maintenance, for more than 5 years shall not be considered temporary. Under such conditions, that structure, regardless of its type, shall be considered the minimum adequate to remain in place and evaluated accordingly.

If this item is coded T, then all data recorded for the structure shall be for the condition of the structure without temporary measures, except for the following items which shall be for the temporary structure:

WSBIS Item

- 1499 – Inventory Route, Minimum Vertical Clearance
- 1293 – Structure Open, Posted, or Closed to Traffic
- 1491 – Inventory Route, Total Horizontal Clearance
- 1370 – Minimum Vertical Clearance Over Bridge Roadway
- 1374 – Minimum Vertical Underclearance
- 1379 – Minimum Lateral Underclearance on Right
- 1383 – Minimum Lateral Underclearance on Left
- 1660 – Bridge Posting

NBI Commentary:

WSDOT has defined a 5 year time period for which temporary structures or conditions can be in place and still considered temporary. The NBI coding guide refers to “a significant period of time.”

WSBIS Item 1292 – Historic Significance – NRHP**Pulldown**

NBI Item 37

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

This item establishes historical significance based on a criteria established by the National Register of Historic Places (NRHP). Generally the Washington State Department of Archaeology and Historic Preservation (DAHP) performs a review based on this criteria.

Use one of the following codes:

Table 1292 Historical Significance - NRHP

WSBIS Code	NBI Code	Description
1	1	Structure is on the NRHP.
2	2	Structure is eligible for the NRHP.
3	3	Structure is possibly eligible for the NRHP but requires further investigation before determination can be made. Alternately, structure is on a State or local historic register.
4	4	Historical significance has not been determined at this time. (This code should be used for all new structures.)
5	5	Structure is not eligible for the NRHP – reviewed by the DAHP.
6	5	Structure is not eligible for the NRHP – reviewed by agency other than the DAHP.

WSBIS Item 2295 – Historic Significance – HAER**Pulldown****Applicable Structure Types**

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

This item establishes historical significance based on a criteria established by the Historic American Engineering Record (HAER).

Use one of the following codes:

Table 2295 Historical Significance - HAER

WSBIS Code	Description
1	Structure is on the HAER.
2	Structure is eligible for the HAER.
3	Structure is possibly eligible for the HAER but requires further investigation before determination can be made. Alternately, structure is on a State or local historic register.
4	Historical significance has not been determined at this time. (This code should be used for all new structures.)
5	Structure is not eligible for the HAER – reviewed by the DAHP.
6	Structure is not eligible for the NRHP – reviewed by agency other than the DAHP.

WSBIS Item 7296 – Historic Significance – Local**Pulldown****Applicable Structure Types**

- All structure records owned by local agencies

This item establishes historical significance using a criteria established by the local agency that owns the structure.

Use one of the following codes:

Table 7296 Historical Significance - Local Agency

WSBIS Code	Description
0	Neither bridge nor crossing is on the local agencies registry or a determination has not been made.
1	Bridge is on the local agency registry.
2	Crossing is on the local agency registry.

WSBIS Item 7281 – Legislative District 1**N(2,0)****Applicable Structure Types**

- All structure records owned by local agencies

This field identifies the first or only State Legislative District in which the bridge is located. If the legislative district is followed by a letter (District 19A, for example), disregard the letter and enter the 2 digit number only.

WSBIS Item 7283 – Legislative District 2**N(2,0)****Applicable Structure Types**

- All structure records owned by local agencies

For bridges which span a State Legislative District dividing line, use this field to identify the second State Legislative District number. Use both this and the Legislative District 1 field to enter the two separate district numbers.

WSBIS Item 2615 – Special Structures Flag**Pulldown**

(Inventory Managed Operation Only)

Applicable Structure Types

- All structure records

This code flags structures that are inspected by the BPO Special Structures group.

- Y Yes, structure inspected by the BPO Special Structures group.
 * Null, structure not inspected by the BPO Special Structures group.

WSBIS Item 2930 – Obsolete Structure Flag (Inv MO only)**Check Box****Applicable Structure Types**

- All structure records

This check box can only be edited in the Inventory Managed Operation, and is used to “obsolete” a structure record. See Sections 2.02.02 and 2.03.04 for more information.

Layout Tab

WSBIS Item 1332 – Year Built	N(4,0)
NBI Item 27	
NTI Item A.1	

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

Code all 4 digits of the year in which construction of the structure was completed. If the year built is unknown, code 1900. If the year built is earlier than 1900, code 1900.

WSBIS Item 1336 – Year Rebuilt	N(4,0)
NBI Item 106	
NTI Item A.2	

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

Code the year of the last major rehabilitation of the structure. Code all four digits of the year in which reconstruction was completed. If there has been no reconstruction, code 0.

For a structure to be defined as rebuilt, the type of work performed, whether or not it meets current minimum standards, must have been eligible for funding under any of the federal aid funding categories. The eligibility criteria would apply to the work performed regardless of whether all state or local funds or federal aid funds were used.

Some types of work to be considered as rebuilt are widenings and retrofits designed to increase the original structural capacity.

Some types of eligible work **not** to be considered as rebuilt are:

- Safety feature replacement or upgrading (for example, bridge rail, approach guardrail or impact attenuators).
- Painting of structural steel.
- Overlay of bridge deck.
- Utility work.
- Emergency repair to restore structural integrity to the previous status following an accident.
- Retrofitting to correct a deficiency which does not substantially alter physical geometry or increase the load-carrying capacity.
- Work performed to keep a structure operational while plans for complete rehabilitation or replacement are under preparation (for example, adding a substructure element or extra girder).

WSBIS Item 1340 – Structure Length (feet)	N(6,0)
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NBI Item 49

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**
- **For tunnel lengths, use WSBIS Item 1349**

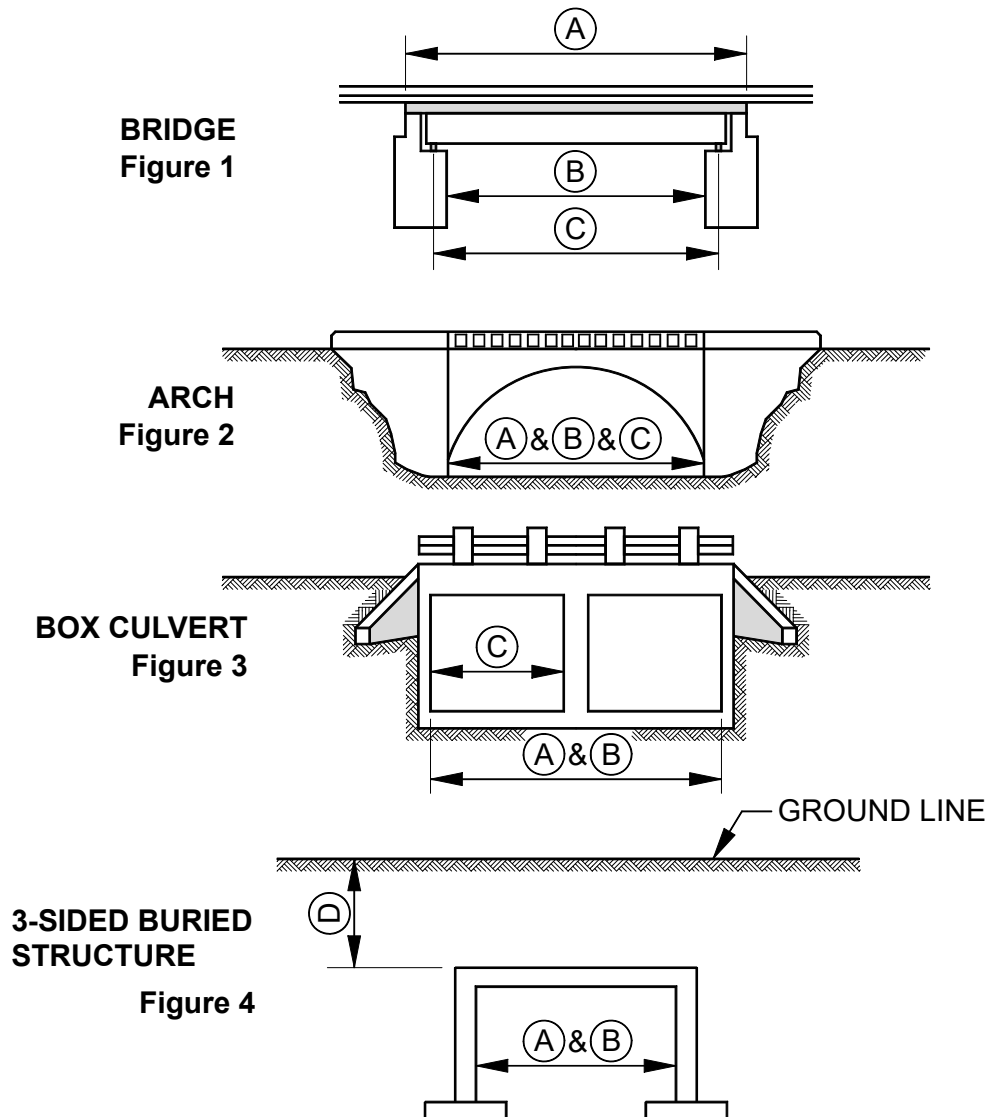
The structure length is recorded in whole feet, rounded up. For example 22.1 feet measured shall be coded as 23 feet.

Bridge lengths (vehicular, pedestrian, RR, etc) are measured along the centerline of the bridge and back to back of backwalls of abutments or from paving notch to paving notch.

Culvert lengths are measured from inside face to inside face of the exterior walls or from spring line to spring line. When the culvert is not perpendicular to the roadway, the roadway centerline length must be calculated.

Oddly configured structures over roadways (plazas, buildings, etc) should be measured to most reasonably represent the structure length.

Figure WSBIS 1340a



WHEN $(D) > \frac{(B)}{2}$ CODE STRUCTURE AS CULVERT.

WHEN $(D) \leq \frac{(B)}{2}$ CODE STRUCTURE AS BRIDGE.

(A) = STRUCTURE LENGTH (WSBIS ITEM 1340)

(B) = NBIS LENGTH (WSBIS ITEM 2346) OR MAXIMUM OPENING

(C) = MAXIMUM SPAN LENGTH (WSBIS ITEM 1348)

(D) = FILL DEPTH (Use the minimum depth measured for this)

Figure WSBIS 1340b

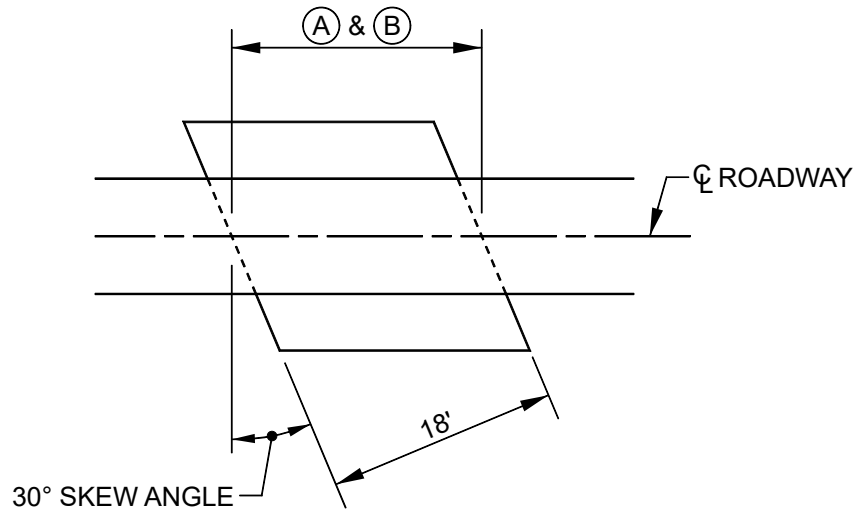


Figure 1

$$\textcircled{A} \& \textcircled{B} = \frac{18'}{\cos 30^\circ} = 20.78' = 21'$$

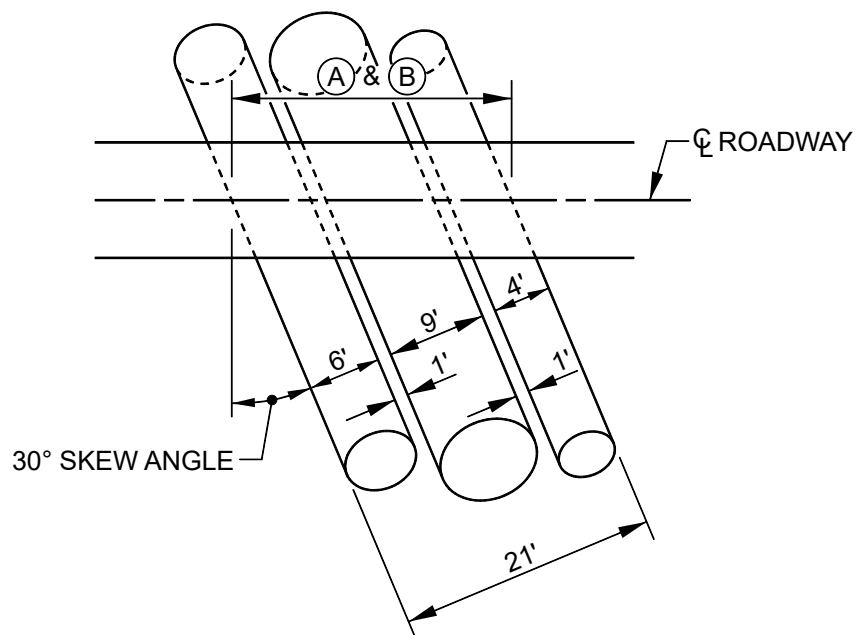


Figure 2

$$\textcircled{A} \& \textcircled{B} = \frac{21'}{\cos 30^\circ} = 24.25' = 25'$$

NOTE: THE DISTANCE BETWEEN CONSECUTIVE PIPES MUST BE EQUAL TO (\geq) OR LESS THAN ($<$) 1/2 THE DIAMETER OF THE SMALLEST PIPE IN THE SERIES FOR THE SERIES TO BE CONSIDERED ONE STRUCTURE.

WSBIS Item 2346 – Screening Length (feet)	N(3,1)
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Applicable Structure Types

- **Bridges & culverts carrying public roadways**

If the Structure Length is between 19 and 23 feet inclusive, the NBIS length shall be coded. If the Structure Length is outside these limits, leave this field blank.

The screening length is a measurement along the center of the roadway between undercopings of abutments, spring lines of arches, or the extreme ends of openings for multiple boxes. This measurement is coded to the nearest tenth of a foot and may be different from the measurement entered in WSBIS Item 1340 – Structure Length. See Structure Length for examples on how to determine the NBIS Length. If a measurement is even very minimally over 20 feet long, round up to the next 10th of a foot.

The NBIS criteria defines a bridge as being greater than 20 feet in length. The NBIS length is used to assist in determining if the structure meets the NBIS definition and therefore reported to FHWA.

WSBIS Item 1348 – Maximum Span Length (feet)	N(5,0)
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NBI Item 48

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**

The length of the maximum span shall be recorded in whole feet. The measurement shall be along the centerline of the bridge. Measure center to center of bearing points or clear open distance between piers, bents, or abutments otherwise.

A span that contains a drop-in span with cantilevers is counted as one span, and the length shall be measured from pier to pier.

See WSBIS Item 1340 – Structure Length for examples on how to determine the length of maximum span.

WSBIS Item 1352 – Lanes On	N(2,0)
NBI Item 28A	

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways

Code the number of lanes being carried on the structure. For pedestrian, RR and other non-vehicular structures, code 0.

Include all lanes carrying highway traffic (e.g., cars, trucks, buses) which are striped or otherwise operated as a full width traffic lane for the entire length of the structure. This shall include any full width merge lanes and ramp lanes, and shall be independent of directionality of usage (e.g., a 1-lane bridge carrying 2-directional traffic is still considered to carry only one lane on the structure).

It should be noted here that for the purpose of evaluating WSBIS Item 1658 Deck Geometry, any 1-lane bridge, not coded as a ramp (WSBIS Item 1434 = 7), which has a WSBIS Item 1356 Curb-to-Curb coded 16 feet or greater shall be evaluated as 2 lanes.

Double deck bridges may be coded as 1 or 2 structures, but all related data must be compatible with the method selected.

WSBIS Item 1356 – Curb-to-Curb Width (feet)	N(4,1)
NBI Item 51	
NTI Item G.3	

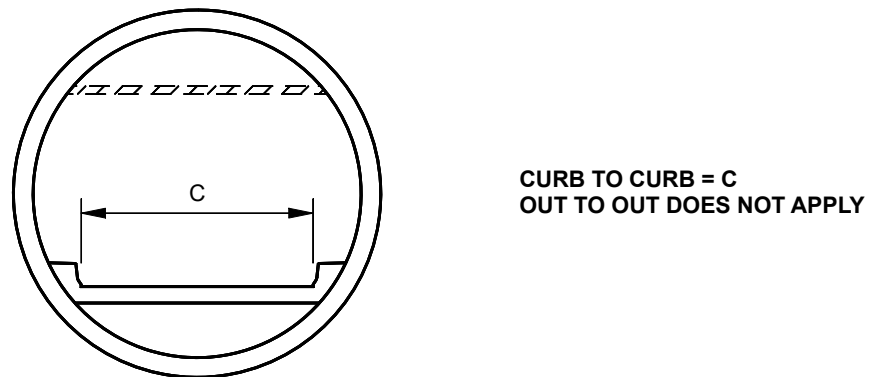
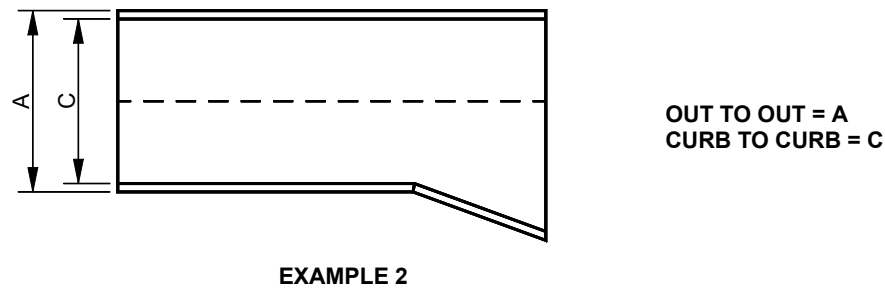
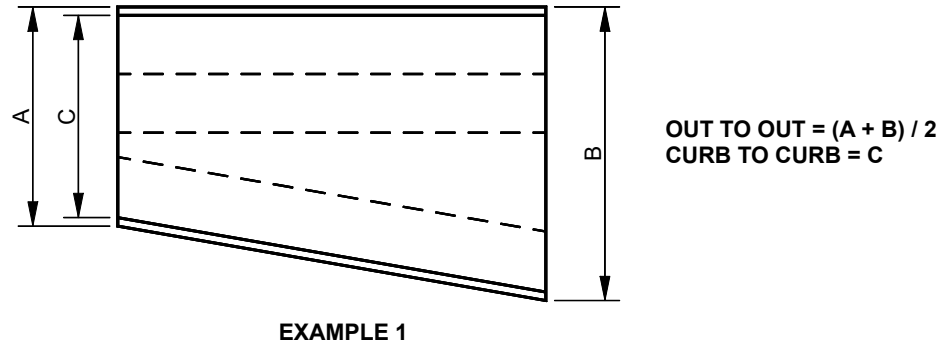
Applicable Structure Types

- Bridges & culverts carrying public roadways
- Tunnels carrying public roadways within

Code the curb-to-curb width to the nearest tenth of a foot. The information to be recorded is the most restrictive minimum distance between curbs or rails on the structure roadway. The measurement should be exclusive of flared areas for ramps.

For structures with closed medians and usually for double decked structures, coded data will be the sum of the most restrictive minimum distances for all roadways carried by the structure*. The data recorded for this item must be compatible with other related route and structure data (e.g., Lanes On, Lanes Under, ADT, etc.). See examples in WSBIS Items 1364 and 1367.

Figure WSBIS 1356a



Where traffic runs directly on the top slab (or wearing surface) of a culvert-type structure (e.g., an R/C box without fill), code the actual roadway width (curb-to-curb or rail-to-rail). This will also apply where the fill is minimal and headwalls or parapets affect the flow of traffic.

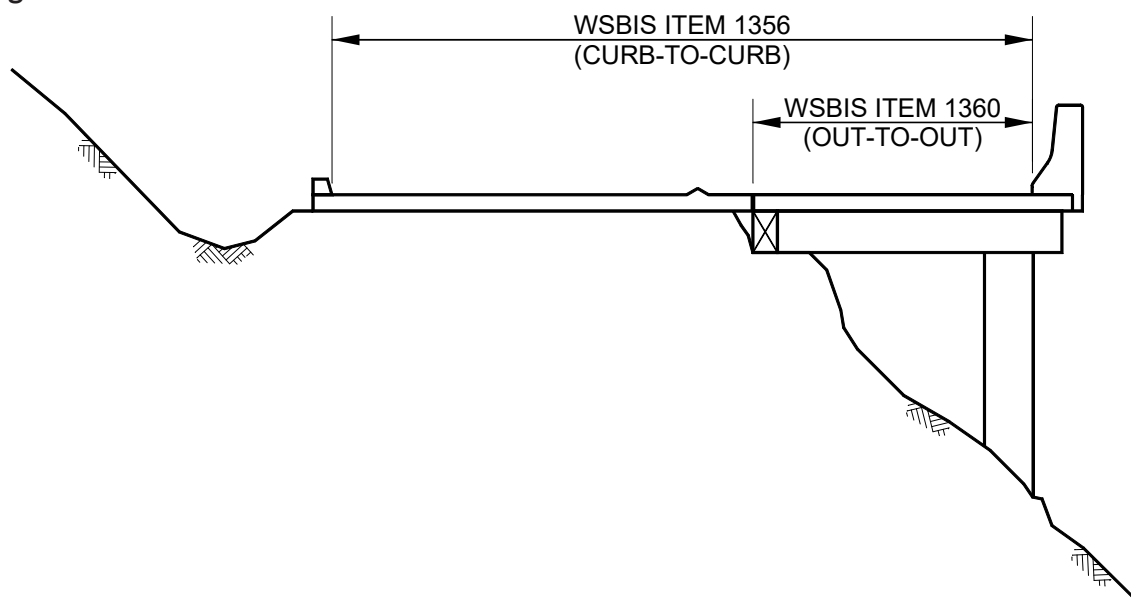
Where the roadway is on fill carried across a structure and the headwalls or parapets do not affect the flow of traffic, code 0. This is considered proper inasmuch as a filled section simply maintains the roadway cross section.

*Raised or non-mountable medians, open medians, and barrier widths are to be excluded from the summation along with barrier-protected bicycle and equestrian lanes.

For a 3 sided structure with a determined amount of fill on the deck less than B/2: Code the curb-to-curb by using the representative roadway width. For example, this may be represented by the distance between the curbs, guardrails or edge of pavement.

Coding a sidehill viaduct (half bridge):

Figure WSBIS 1356b



WSBIS Item 1360 – Out-to-Out Deck Width (feet)
N(4,1)

NBI Item 52

Applicable Structure Types

- Bridges & culverts carrying public roadways

Code the out-to-out width to the nearest tenth of a foot. If the structure is a through structure, the number to be coded will represent the lateral clearance between superstructure members. See example in Figure WSBIS 1364a.

The measurement will be the most representative out-to-out width on the bridge, and should be exclusive of flared areas for ramps. See examples in Figures WSBIS 1356a and 1364b.

Where traffic runs directly on the top slab (or wearing surface) of the culvert (e.g., an R/C box without fill) code the actual width (out-to-out). This will also apply where the fill is minimal and the culvert headwalls affect the flow of traffic. However, for sidehill viaduct structures code the actual out-to-out structure width. See Figure WSBIS 1356b.

Where the roadway is on a fill carried across a pipe or box culvert and the culvert headwalls do not affect the flow of traffic, code 0. This is considered proper inasmuch as a filled section over a culvert simply maintains the roadway cross-section.

For a 3 sided structure with a determined amount of fill on the deck less than B/2:

Code the out-to-out deck width by measuring the extents of the bridge width perpendicular to the centerline of the roadway above.

WSBIS Item 1364 – Sidewalk/Curb Width Left (feet)
N(3,1)

NBI Item 50A

NTI Item G.4

WSBIS Item 1367 – Sidewalk/Curb Width Right (feet)

N(3,1)

NBI Item 50B

NTI Item G.5

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Tunnels carrying public roadways within

Code the widths of the left and right curbs or sidewalks to the nearest tenth of a foot, **with left and right determined by bridge orientation, not route orientation**. Code 0 when there are no curbs or sidewalks.

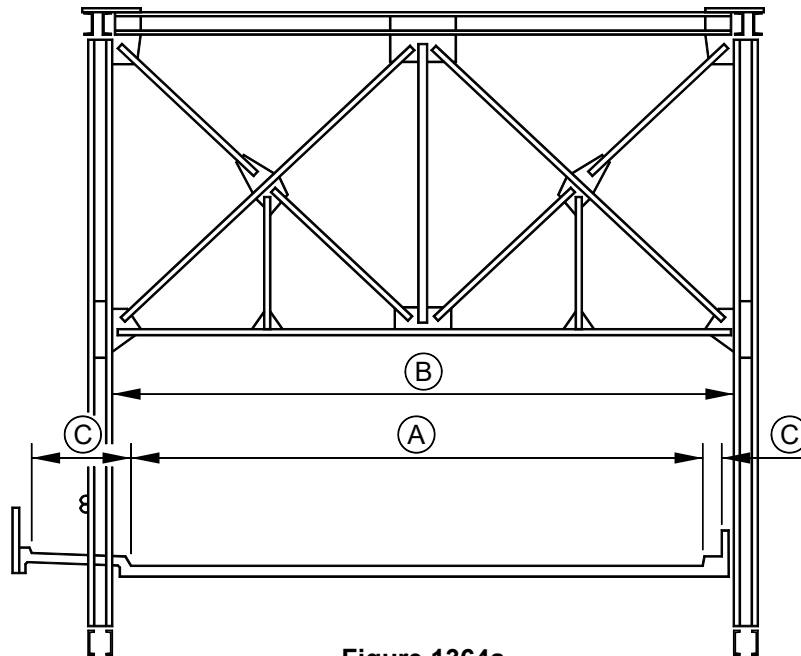
Figure WSBIS 1364a**Figure 1364a**

Figure WSBIS 1364b

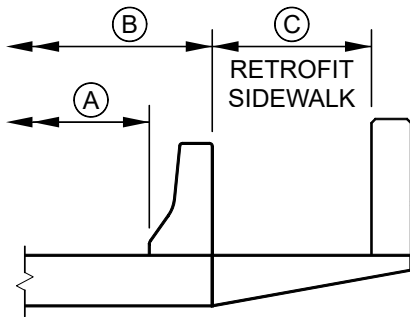


Figure 1

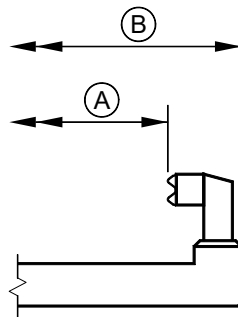


Figure 2

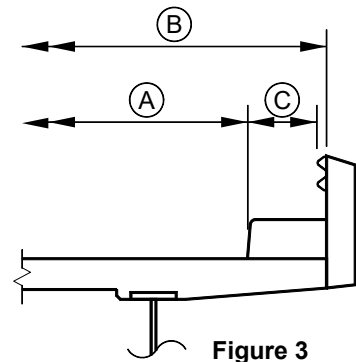


Figure 3

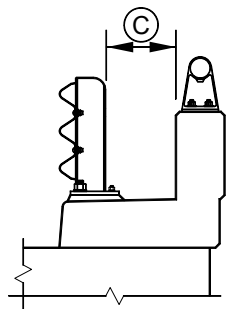


Figure 4

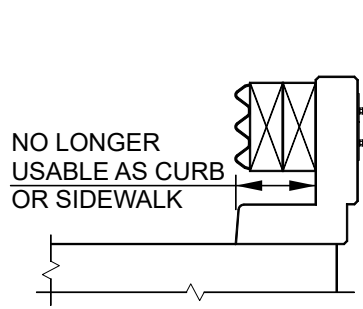


Figure 5

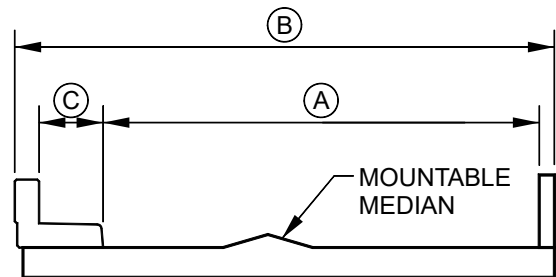


Figure 6

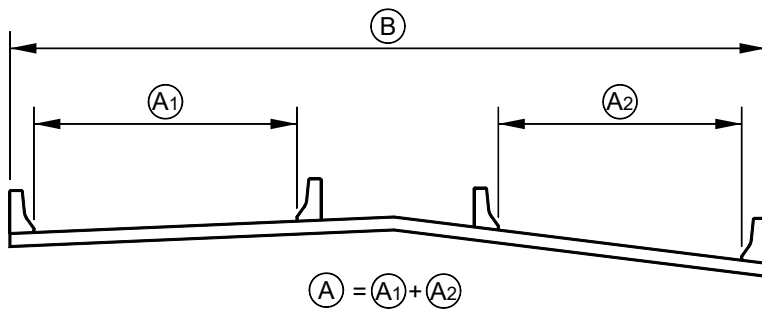


Figure 7

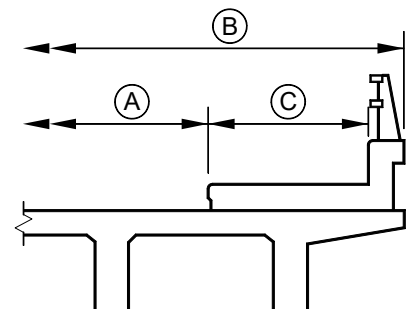


Figure 8

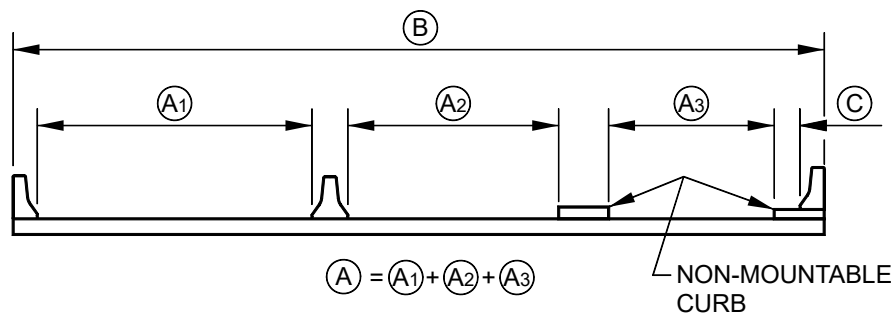


Figure 9

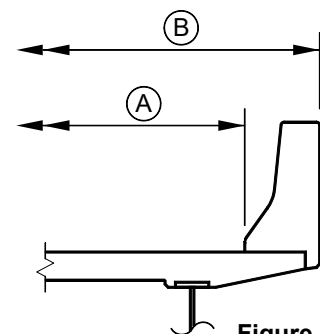


Figure 10

- (A) WSBIS 1356 - ROADWAY WIDTH, CURB-TO-CURB
- (B) WSBIS 1360 - DECK WIDTH, OUT-TO-OUT
- (C) WSBIS 1364 AND 1367 - CURB OR SIDEWALK WIDTH

Figure WSBIS 1364c

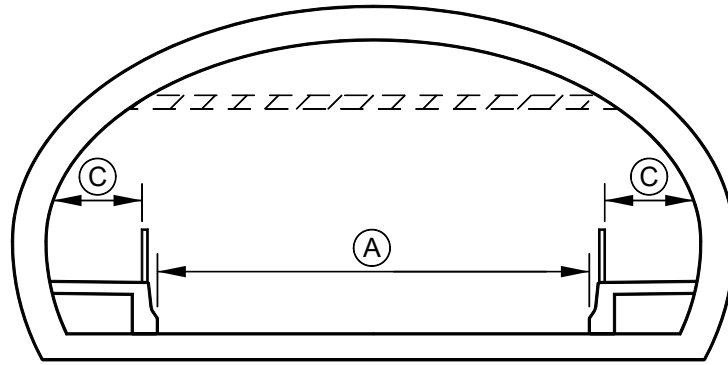


Figure 1364c

- (A) WSBIS 1356 - ROADWAY WIDTH, CURB-TO-CURB
- (B) WSBIS 1360 - DECK WIDTH, OUT-TO-OUT
- (C) WSBIS 1364 AND 1367 - CURB OR SIDEWALK WIDTH

 WSBIS Item 1310 - Skew (degrees)

N(2,0)

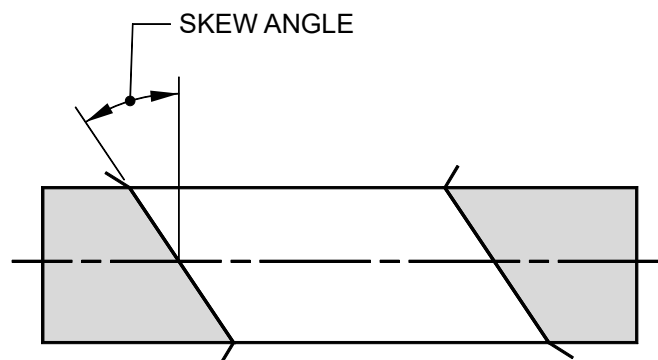
NBI Item 34

Applicable Structure Types

- Bridges & culverts carrying public roadways

The skew angle is the angle between the centerline of a pier and a line normal to the roadway centerline. When plans are available, the skew angle can be taken directly from the plans. If no plans are available, the angle is to be field measured if possible. Record the skew angle to the nearest degree. If the bridge piers are perpendicular to roadway centerline, code 0. When the structure is on a curve or if the skew varies for some other reason, the average skew should be recorded, if reasonable. Otherwise, record 99 to indicate a major variation in skews of substructure units.

Figure WSBIS 1310



WSBIS Item 1312 – Flared Flag

Pulldown

NBI Item 35

Applicable Structure Types

- Bridges & culverts carrying public roadways

Code this item to indicate if the structure is flared (i.e., the width of the structure varies). Generally, such variance will result from ramps converging with or diverging from the through lanes on the structure, but there may be other causes. Minor flares at ends of structures should be ignored.

Table 1312 Flared Flag

WSBIS Code	NBI Code	Description
N	0	No flare
Y	1	Yes, flared

WSBIS Item 1370 – Minimum Vertical Clearance Over Deck (feet & inches)

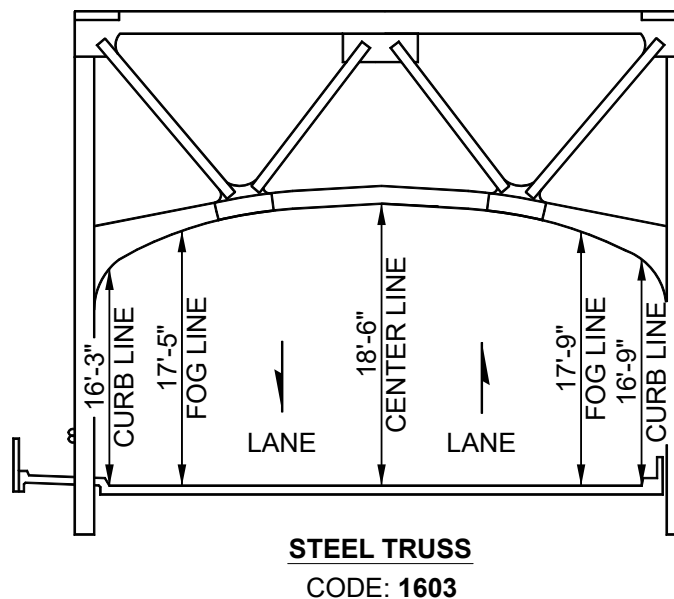
N(4,0)

NBI Item 53

Applicable Structure Types

- Bridges & culverts carrying public roadways

The information to be recorded for this item is the actual minimum vertical clearance over the bridge roadway, including shoulders, to any superstructure restriction, in feet and inches, rounded to the lesser inch (e.g., 16' 3¾" is to be coded 1603). For double decked structures code the minimum, regardless whether it is pertaining to the top or bottom deck. When no superstructure restriction exists above the bridge roadway code 9999. When a restriction is 100 feet or greater code 9912.

Figure WSBIS 1370

WSBIS Item 1374 – Minimum Vertical Clearance Under Bridge (feet & inches)	N(4,0)
NBI Item 54B	

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**

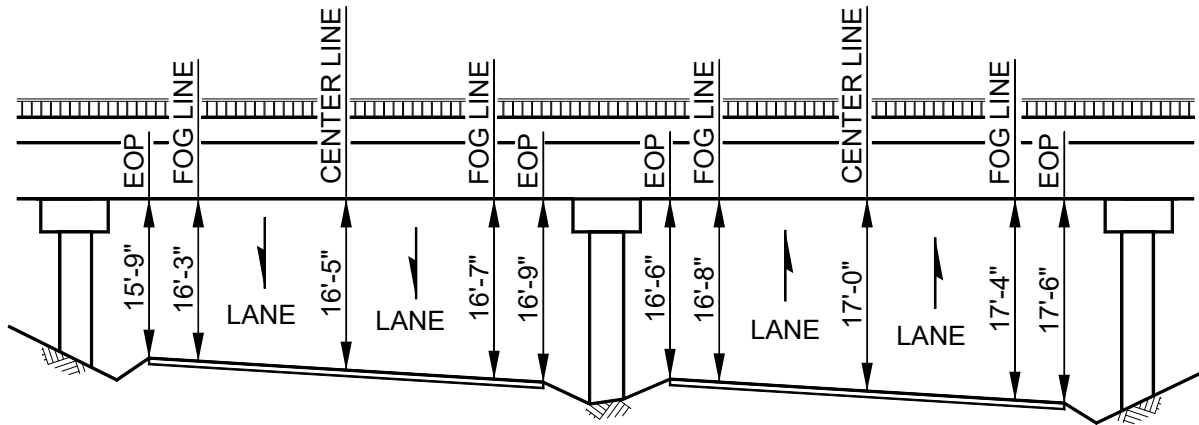
Code the minimum vertical clearance from the roadway (travel lanes only) or railroad track beneath the structure to the underside of the superstructure. Traveled way, or travel lanes, is between fog lines and excludes shoulders or gore areas.

If the bridge crosses both a highway and a railroad, code the highway clearance UNLESS the railroad has a substandard clearance based on current design criteria and the roadway is NOT substandard.

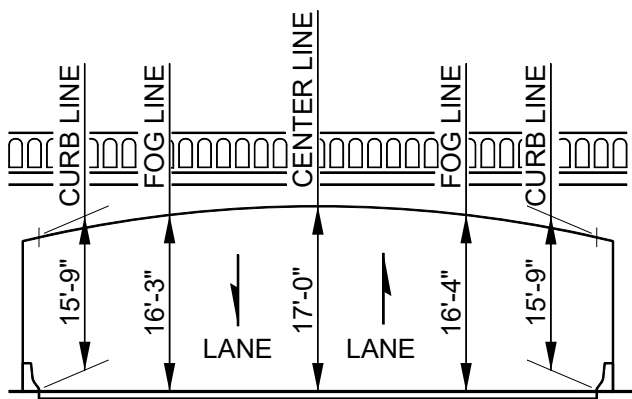
The information to be recorded is the actual minimum vertical clearance over the traveled way to the structure, in feet and inches, rounded to the lesser inch (e.g., 16' 3¾" is to be coded 1603). When a restriction is 100 feet or greater, code 9912.

If the feature is not a highway or railroad, code the minimum vertical clearance 0. A highway is to be considered any functionally classified, public road. Private roads are not to be included.

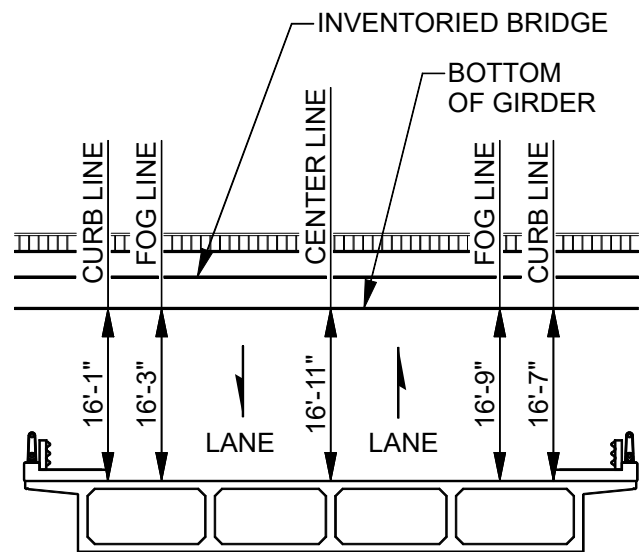
Figure WSBIS 1374



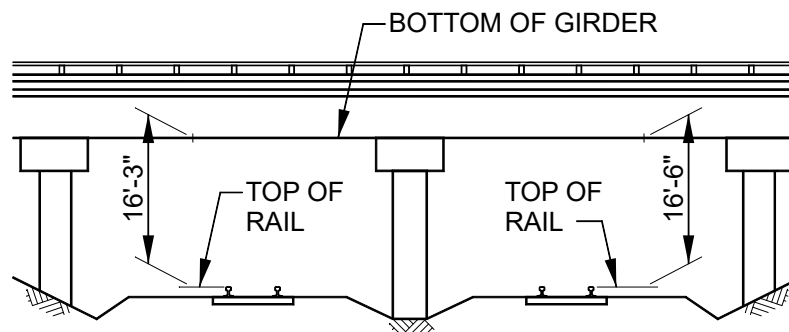
DIVIDED HIGHWAY (Fig. 1374a)
CODE: 1603



UNDIVIDED HIGHWAY (Fig. 1374b)
CODE: 1603



BRIDGE OVER BRIDGE (Fig. 1374c)
CODE: 1603



RAILROAD (Fig. 1374d)
CODE: 1603

WSBIS Item 1378 – Vertical Underclearance Code

Pulldown

NBI Item 54A

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways

Code the reference feature from which the clearance measurement is taken:

Table 1378 Vertical Underclearance Code

WSBIS Code	Description
H	Highway beneath structure
R	Railroad beneath structure
N	Feature not a highway or railroad

WSBIS Item 1379 – Minimum Lateral Underclearance Right (feet)

N(3,1)

NBI Item 55B

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways

The purpose of this item is to identify the lateral restrictions caused by the structure on the railroad or roadway underneath.

Code the minimum lateral underclearance on the right to the nearest tenth of a foot. When both a railroad and highway are under the structure, code the most critical dimension.

The lateral clearance should be measured from the right edge of the roadway excluding shoulders (fog line) or from the centerline (between rails) of the right-hand track of a railroad to the nearest substructure unit (pier, abutment, etc.), a retaining wall or to a slope. If no fog line exists on the roadway, assume a 12 foot lane. The right/left orientation is based on traffic direction. The clearance measurements to be recorded will be the minimum after measuring the clearance in both directions of travel, perpendicular to the centerline of the undercrossing.

If two related features are below the bridge, measure both and record the lesser of the two. An explanation should be written on the inspection form as to what was recorded. When the clearance is 100 feet or greater, code 99.9.

If the feature beneath the structure is not a railroad or highway, code 0 to indicate not applicable.

The presence of ramps and acceleration or turning lanes is not considered in this item; therefore, the minimum lateral clearance on the right should be measured from the right edge of the through roadway.

Figure WSBIS 1379a

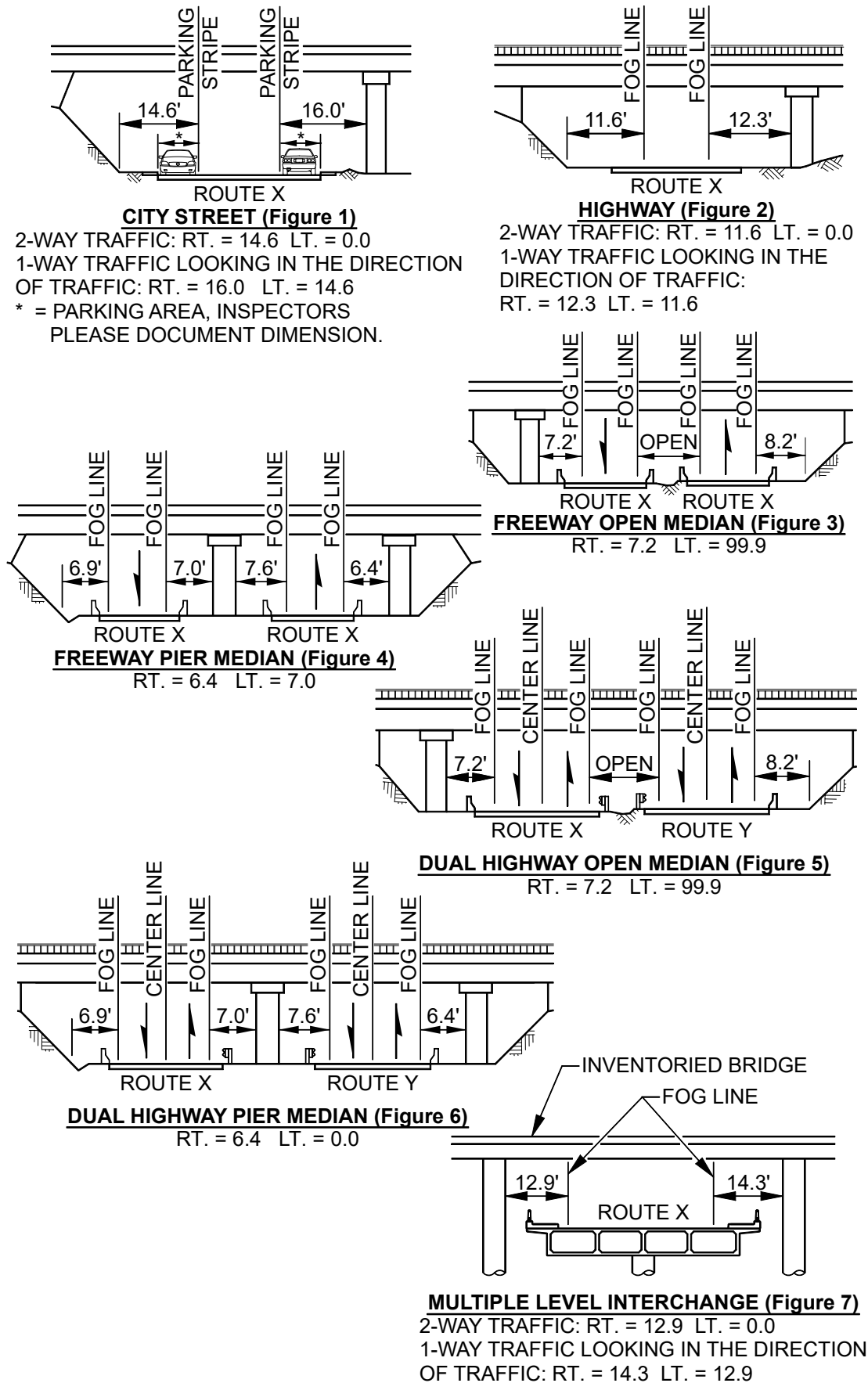
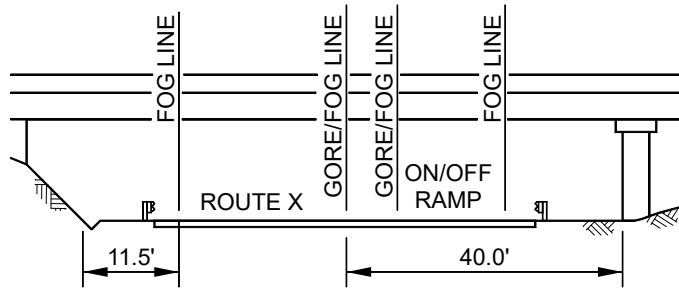
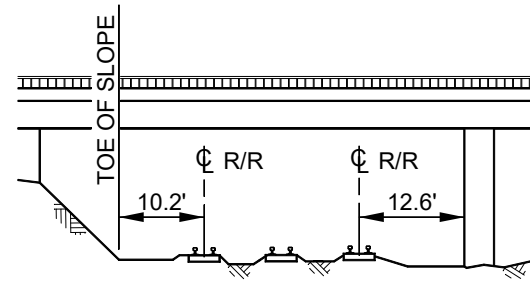


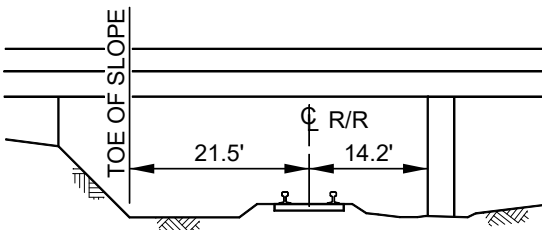
Figure WSBIS 1379b

**FREEWAY ON/OFF RAMP (Figure 1)**

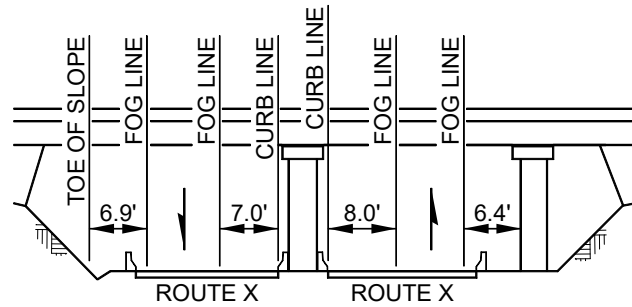
2-WAY TRAFFIC: RT. = 11.5 LT. = 0.0
 1-WAY TRAFFIC LOOKING IN THE DIRECTION
 OF TRAFFIC: RT. = 40.0 LT. = 11.5

**RAILROAD MULTIPLE TRACK (Figure 2)**

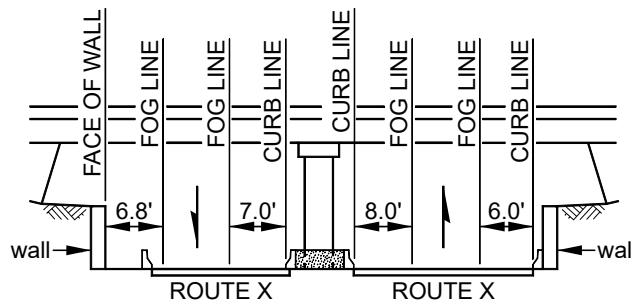
RT. = 10.2 LT. = 0.0

**RAILROAD SINGLE TRACK (Figure 3)**

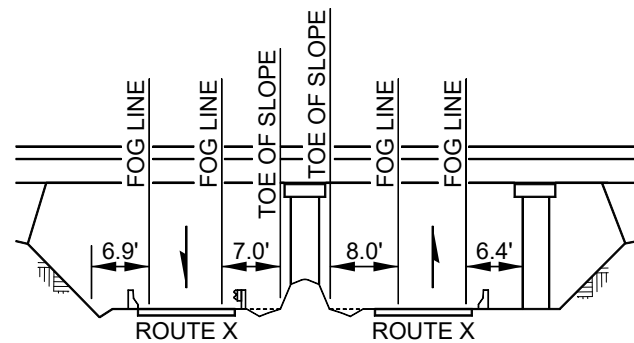
RT. = 14.2 LT. = 0.0

**FREEWAY PIER MEDIAN WITH
BARRIER ADJACENT TO SUBSTRUCTURE (Figure 4)**

RT. = 6.4 LT. = 7.0

**FREEWAY PIER MEDIAN WITH CONCRETE/DIRT FILL
BETWEEN BARRIERS AROUND SUBSTRUCTURE (Figure 5)**

RT. = 6.0 LT. = 7.0

**FREEWAY PIER MEDIAN WITH
MOUNDED DIRT AROUND SUBSTRUCTURE (Figure 6)**

RT. = 6.4 LT. = 7.0

NBI Commentary:

The NBI coding guide text and drawings are not clear or consistent, particularly with respect to determining whether or not the lateral measurements extend to guardrails, concrete rails, non-mountable curbs, substructure units, or slopes. Attempts to define the steepness of slopes was also problematic. This coding guide clarifies that all measurements are to substructure units or "slopes" without defining the steepness. In addition, the NBI coding guide was not entirely clear about how to code dual highways in relation to substructure units or medians. This coding guide clarifies this through illustration.

WSBIS Item 1382 – Lateral Underclearance Code

Pulldown

NBI Item 55A

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways

This code identifies the type of reference feature from which the clearance measurement is taken.

Table 1382 Lateral Underclearance Code

WSBIS Code	Description
H	Highway beneath structure
R	Railroad beneath structure
N	Neither highway or railroad beneath structure

WSBIS Item 1383 – Minimum Lateral Underclearance Route Left (feet)

N(3,1)

NBI Item 56

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways

The purpose of this code is to identify the lateral restrictions caused by the structure on the railroad or roadway underneath when restrictions exist to left lanes of divided highways, 1 way streets, and ramps. For all 2 direction, 2 lane routes which are undivided, code 0.

Code the minimum lateral underclearance on the left (median side for divided highways) to the nearest tenth of a foot. The lateral clearance should be measured from the left edge of the roadway (excluding shoulders) to the nearest substructure unit, or to a slope. Refer to examples for WSBIS Item 1379 – Minimum Lateral Underclearance on Right.

For clearances greater than 100 feet, code 99.8.

In cases where there is an open median (no piers in median), code 99.9.

Code 0 to indicate not applicable (railroads and other non highway undercrossings).

NBI Commentary:

See WSBIS Item 1379 NBI Commentary.

WSBIS Item 1386 – Navigation Control**Pulldown**

NBI Item 38

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways

Indicate for this item whether or not navigation control (a bridge permit for navigation) is required. Use one of the following codes:

Table 1386 Navigation Control Code

WSBIS Code	Description
N	Not applicable, no waterway
0	No navigation control on waterway (bridge permit not required or bridge has received advance approval by the USCG1
1	Navigation control on waterway (bridge permit required)

1. The USCG provides “advance approval” of certain navigable waters. This item should be coded 0 when Title 33, Code of Federal Regulations, Section 115.70, as amended states that the U.S. Coast Guard Commandant has given advance approval to the location and plans of bridges to be constructed across reaches of waterways navigable in law, but not actually navigated other than by logs, log rafts, rowboats, canoes and small motorboats.

For state owned structures, this item is coded by the BPO Information Group. Local agencies need to contact USCG to determine the correct coding for this field:

Commander, Thirteenth Coast Guard District

Federal Building
915 Second Avenue
Seattle, WA 98174-1067
206-220-7282

NBI Commentary:

This coding guide provides additional guidance on how to code bridges crossing advance approval waterways.

WSBIS Item 1387 – Navigation Vertical Clearance (feet) **N(3,0)**

NBI Item 39

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**

If WSBIS Item 1386 – Navigation Control has been coded 1, record the minimum vertical clearance imposed at the site as measured above a datum that is specified on a navigation permit issued by a control agency. The measurement shall be coded to the foot. This measurement will show the clearance that is allowable for navigational purposes. In the case of a swing or bascule bridge, the vertical clearance shall be measured with the bridge in the closed position (i.e., open to vehicular traffic). The vertical clearance of a vertical lift bridge shall be measured with the bridge in the raised or open position. Also, WSBIS Item 1394 – Vertical Lift Minimum Navigation Clearance shall be coded to provide clearance in a closed position. If WSBIS Item 1386 – Navigation Control has been coded 0 or N, code 0 to indicate not applicable.

For state owned structures, this item is coded by the BPO Information Group.

WSBIS Item 1390 – Navigation Horizontal Clearance (feet) **N(4,0)**

NBI Item 40

Applicable Structure Types

- **Bridges & culverts carrying public roadways**
- **Pedestrian, RR and other non-vehicular structures over public roadways**

If WSBIS Item 1386 – Navigation Control has been coded 1, record the horizontal clearance measurement imposed at the site that is shown on the navigation permit. This may be less than the structure geometry allows. If a navigation permit is required but not available, use the minimum horizontal clearance between fenders, if any, or the clear distance between piers or bents. Code the clearance to the foot. If WSBIS Item 1386 – Navigation Control has been coded 0 or N, code 0 to indicate not applicable.

For state owned structures, this item is coded by the BPO Information Group.

WSBIS Item 1394 – Vertical Lift Minimum Navigation Clearance (feet) **N(3,0)**

NBI Item 116

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Code the minimum vertical clearance to the nearest lesser foot imposed at the site as measured above a datum that is specified on a navigation permit issued by a control agency.

For state owned structures, this item is coded by the BPO Information Group.

NBI Commentary:

Per FHWA guidance , ferry terminal structures coded as lift spans should have 0 coded in this field. See FHWA general index file.

WSBIS Item 1291 – Median

Pulldown

NBI Item 33

Applicable Structure Types

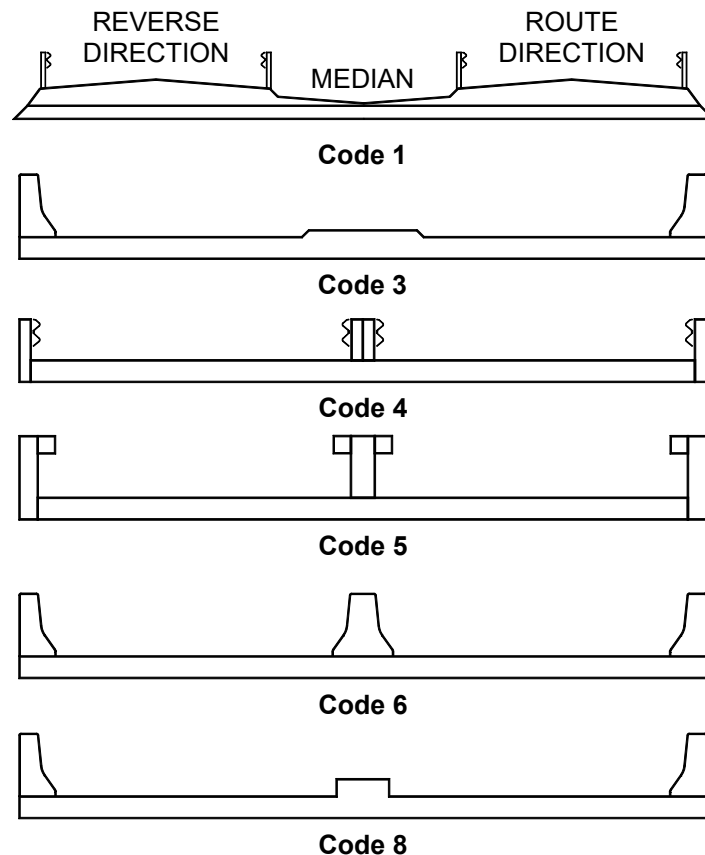
- Bridges & culverts carrying public roadways

Indicate with a 1-digit code if the median is nonexistent, open or closed. The median is closed when the area between the 2 roadways at the structure is bridged over and is capable of supporting traffic. All bridges that carry either 1-way traffic or 2-way traffic separated only by a centerline will be coded 0 for no median.

Table 1291 Median Code

WSBIS Code	NBI Code	Description
0	0	No median (undivided highway)
1	1	Open median
2	2	Closed median – painted only
3	2	Closed median – mountable curb (<6" vertical surface, or sloped surface)
4	3	Closed median – flex or thrie beam
5	3	Closed median – box beam guardrail
6	3	Closed median – concrete barrier
8	3	Closed median – non-mountable curb (6" or greater vertical surface)
9	3	Other median

Figure WSBIS 1291



NBI Commentary:

This coding guide split out various types of medians that are translated to the NBI coding guide as described above.

WSBIS Item 1397 – Approach Roadway Width (feet) **N(3,0)**

NBI Item 32

Applicable Structure Types

- Bridges & culverts carrying public roadways

Code the normal width of usable roadway approaching the structure measured to the nearest foot. Usable roadway width will include the width of traffic lanes and the widths of shoulders where shoulders are defined as follows:

Shoulders must be constructed and normally maintained flush with the adjacent traffic lane, and must be structurally adequate for all weather and traffic conditions consistent with the facility carried. Unstabilized grass or dirt, with no base course, flush with and beside the traffic lane, is not to be considered a shoulder for this item.

For structures with medians of any type and double decked structures, this item should be coded as the sum of the usable roadway widths for the approach roadways (i.e., all median widths which do not qualify as shoulders should not be included in this dimension). When there is a variation between the approaches at either end of the structure, code the most restrictive of the approach conditions.

If a ramp is adjacent to the through lanes approaching the structure, it shall be included in the approach roadway width.

WSBIS Item 2368 – Min. Vertical Clearance Over Deck Override (feet & inches) **N(4,0)**

Applicable Structure Types

- Bridges & culverts carrying public roadways for records maintained by BPO

When a bridge is located underneath one or more bridges (stacked bridges), code the actual minimum vertical clearance over the bridge roadway, including shoulders, to the superstructure restriction caused by the controlling overhead bridge, in feet and inches, rounded to the lesser inch (e.g., 16' 3¾" is to be coded 1603).

Crossing Tab

WSBIS Items 1432, 1433, 1434, and 1435

NBI Item 5

The inventory route is composed of 4 segments.

Table 7 Inventory Route Items

WSBIS Item	NBI Item	NTI Item	Description
1432	5A	n/a	Record Type
1433	5B	1.9	Route Signing Prefix
1434	5C	n/a	Designated Level of Service
1435	5D	1.7	Route Number

WSBIS Item 1432 – Inventory Route On/Under

Pulldown

NBI Item 5A

Applicable Structure Types

- All structure records

There are two types of WSBIS and NBI records: On and Under. The NTI makes no distinction for tunnels, and WSBIS treats all tunnel records as Under records.

Table 1432 - On/Under Code			
WSBIS Code	NBI Code	NTI Code	Description
1	1	n/a	Route carried on a bridge (not used for routes over a tunnel)
2	2	n/a	Single route goes under a bridge or through a tunnel
A – Z	A – Z	n/a	Multiple routes go under a bridge (no provision to code multiple routes through a tunnel)
0	n/a	n/a	No route on or under a structure

On signifies that the inventory route is carried on a bridge, but not over a tunnel. All of the NBI data items must be coded, unless specifically excepted, with respect to the bridge and the inventory route on it.

Under signifies that the inventory route goes under the structure if it's a bridge, and through a structure if it's a tunnel. If an inventory route beneath a bridge is a Federal-aid highway, is a STRAHNET route or connector or is otherwise important, it must be reported to the NBI. The type code must be 2 or an alphabetic letter A through Z. Code 2 for a single route under a bridge and for all tunnels. If two or more routes go under a bridge, code A, B, C, D, etc., consecutively for multiple routes on separate roadways under the same structure. STRAHNET routes shall be listed first. When this item is coded 2 or A through Z for bridges, only selected items are coded, as specified in the item descriptions and in the list in Table 2.

It cannot be overemphasized that all route-oriented data must agree with the coding as to whether the inventory route is on or under a bridge.

There are situations of a route under a bridge, where the bridge does not carry a highway, but may carry a railroad, pedestrian traffic, or even a building. These are coded the same as any other Under record and no On record shall be coded.

For additional clarification of On and Under records, refer to the Coding Guide Instructions.

NBI Commentary:

WSDOT created code 0 to indicate the bridge does not carry nor cross over a highway. An example would be a pedestrian structure over a waterway. These are not NBI bridges but may be included in the inventory at each agency's discretion.

WSBIS Item 1433 – Inventory Route Highway Class**Pulldown**

NBI Item 5B

NTI Item I.9

Applicable Structure Types

- All structure records

Identify the highway class for the inventory route using one of the following codes:

Table 1433 Inventory Route Highway Class

WSBIS Code	Description
1	Interstate highway
2	U.S. numbered highway
3	State highway
4	County road
5	City street
6	Federal lands road
7	State lands road
8	Other (include toll roads not otherwise identifiable above) OR when there is no inventory route

Code 8 when there is no inventory route.

When 2 or more routes are concurrent, the highest class of route will be used. The hierarchy is in the order listed above.

WSBIS Item 1434 – Inventory Route Service Level**Pulldown**

NBI Item 5C

Applicable Structure Types

- All structure records

Identify the service level for the inventory route using one of the following codes, including tunnels:

Table 1434 Inventory Route Service Level

WSBIS Code	Description
1	Mainline (includes reversible routes)
2	Alternate
3	Bypass
4	Spur
6	Business
7	Ramp, Wye, Connector, etc.
8	Service and/or unclassified frontage road
0	None of the above OR when there is no inventory route

WSBIS Item 1435 – Route	AN(5)
NBI Item 5D	
NTI Item I.7	

Applicable Structure Types

- All structure records

Code the route number of the inventory route. This value shall be a five digit number, right justified with leading zeroes filled in.

If concurrent routes are of the same hierarchy level, denoted by the highway class, the lowest numbered route shall be coded. Code 00000 for structures on roads without route numbers.

WSBIS Item 2440 – Milepost (miles)	N(5,2)
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Applicable Structure Types

- All structure records

The milepost is displayed on the inspection report header with the associated route (WSBIS Item 1435). Both are intended to provide information about the location of the structure on the primary route used for inspection access, and should represent the structure milepost relative to nearby milepost signs.

WSBIS Item 1445 – ADT	N(6,0)
NBI Item 29	
NTI Item A.4	

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

Code the average daily traffic (ADT) volume for the inventory route. Code the most recent ADT counts available. Included in this item are the trucks referred to in WSBIS Item 1451 – Average Daily Truck Traffic. If the structure is closed, code the actual ADT from before the closure occurred.

The ADT must be compatible with the other items coded for the structure. For example, parallel bridges with an open median are coded as follows: if WSBIS Item 1352 – Lanes On the Structure and WSBIS Item 1356 – Curb-to-Curb are coded for each bridge separately, then the ADT must be coded for each bridge separately (not the total ADT for the route).

ADT information is available at www.wsdot.wa.gov/mapsdata/tools/traffictrends.

WSBIS Item 1451 – ADT Truck Percentage	N(2,0)
NBI Item 109	
NTI Item A.6	

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

Code the percentage of WSBIS Item 1445 – Average Daily Traffic that is truck traffic on the inventory route. Do not include vans, pickup trucks and other light delivery trucks in this percentage.

NBI Commentary:

The NBI does not require data for Average Daily Truck Traffic if WSBIS Item 1445, ADT, is less than 100. WSDOT requires this data for all routes, regardless of ADT.

NTI Commentary:

The NTI maintains an average daily truck count, not a percentage. WSBIS translates the percentage to a total count using the following formula: ADT x ADT Truck Percentage = ADT Count

WSBIS Item 1453 – ADT Year	N(4,0)
NBI Item 30	
NTI Item A.6	

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

Record the year represented by the ADT in WSBIS Item 1445. Code all four digits of the year. ADT Year information is available at the link in WSBIS Item 1445.

WSBIS Item 1457 – Future ADT	N(6,0)
NBI Item 114	

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

Code the forecasted average daily traffic (ADT) for the inventory route. This shall be projected at least 17 years but no more than 22 years from the last year of routine inspection. If planning data is not available, use the best estimate based on site familiarity.

The future ADT must be compatible with the other items coded for the structure. For example, parallel bridges with an open median are coded as follows: if WSBIS Item 1352 – Lanes On the Structure and WSBIS Item 1356 – Curb-to-Curb are coded for each bridge separately, then the future ADT must be coded for each bridge separately (not the total for the route).

WSBIS Item 1463 – Future ADT Year	N(6,0)
NBI Item 115	

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

Code the year represented by the future ADT in WSBIS Item 1457. The projected year of future ADT shall be at least 17 years but no more than 22 years from the year of routine, short span, or safety inspection.

WSBIS Item 1467 – Linear Referencing System Route	AN(12)
NBI Item 13A	
NTI Item I.11	

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

The linear referencing system (LRS) route is used to establish the location of the structure on the Base Highway Network (see WSBIS Item 1484). It must be from the same LRS route and milepost system as reported in the Highway Performance Monitoring System (HPMS).

Linear Reference is coded to correspond to the location of the crossing as it relates to the WSDOT standard Linear Referencing System (LRS), which must be used and is reported by our state's Highway Performance Monitoring System (HPMS). The HPMS reported LRS consists of both the Local Agency Public Roads (LAPR) LRS and the State Route LRS.

State Route LRS Examples:

599S500035
 529SPEVERET (reported to NBI as 529SPEVERE)
 005
 005LX10130

LAPR Route LRS Examples

760000270 (Israel Road Over I-5)
 460000700 (Taneum Creek Road Over I-90)

NBI and NTI Commentary:

WSDOT maintains a 12 character, alphanumeric LRS route number, but the NBI receives only 10 digits. In most cases WSDOT does not use the 11th or 12th character. For the NBI submittal, any additional characters to the right of the 10th character are trimmed. Route numbers with fewer than 10 characters get reported with no additional leading zeroes added.

WSDOT codes LRS route numbers for all crossing records, but only routes on the Base Highway Network are submitted to the NBI.

The NTI allows up to 120 characters for this field, so complete data is submitted to the NTI.

WSBIS Item 1469 – LRS Milepost (miles)	N(5,2)
NBI Item 11	
NTI Item I.12	

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

The linear referencing system (LRS) milepost is used to establish the location of the structure on the Base Highway Network (see WSBIS Item 1484). It must be from the same LRS route and milepost system as reported in the Highway Performance Monitoring System (HPMS). The milepost coded in this item directly relates to WSBIS Item 1467 – LRS Route. For local agencies, this field generally matches Milepost Item 2440.

This item records the milepost at the beginning of the structure (the lowest milepost on the structure). When the LRS Route goes under the structure (WSBIS Item 1432 coded 2 or A-Z), then code the milepost on the under passing route where the structure is first encountered.

Code to two decimal places. Code all zeroes in this field if the milepost is not available.

WSBIS Item 1483 – National Highway System	Pulldown
NBI Item 104	
NTI Item C.5	

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

For the inventory route identified in WSBIS Item 1435, indicate whether the route is on the National Highway System (NHS) or not on that system. Ramps associated with NHS routes are included as NHS routes. Use one of the following codes:

Table 1483 NHS Code

WSBIS Code	Description
0	Inventory Route is not on the NHS
1	Inventory Route is on the NHS

NBI and NTI Commentary:

WSDOT codes ramps as NHS routes when the associated mainline route is also NHS, in accordance with the NBI federal coding guide, and applied to both bridges and tunnels. However, in accordance with the FHWA Highway Performance Monitoring System (HPMS), ramps are coded 0. The NTI coding guide doesn't specify how ramps in tunnels are coded.

WSBIS Item 1484 – Base Highway Network

Pulldown

NBI Item 12

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

The Base Highway Network includes the mainline portions of the NHS (WSBIS Item 1483 is coded 1), rural/urban principal arterial system and rural minor arterial system. Ramps, frontage roads and other roadways are not included in the Base Network. For the inventory route identified in WSBIS Item 1435 – Inventory Route, use one of the following codes:

Table 1484 Base Highway Network Code

WSBIS Code	Description
0	Inventory Route is not on the Base Network
1	Inventory Route is on the Base Network

WSBIS Item 1485 – STRAHNET Highway

Pulldown

NBI Item 100

NTI Item C.6

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

This item shall be coded for all records in the inventory that are designated as part of the Strategic Highway Network. For the purposes of this item, the STRAHNET Connectors are considered included in the term STRAHNET. For the inventory route identified in WSBIS Item 1435, indicate STRAHNET highway conditions using one of the following codes:

Table 1485 STRAHNET Highway Code

WSBIS Code	NTI Code	Description
0	0	The inventory route is not a STRAHNET route
1	1	The inventory route is on an Interstate STRAHNET route
2	1	The inventory route is on a Non-Interstate STRAHNET route
3	1	The inventory route is on a STRAHNET connector route

NTI Commentary:

Toll codes translated for the NTI as shown in the table above.

WSBIS Item 1486 – Federal Lands Highways**Pulldown**

NBI Item 105

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

- 0 Not applicable
- 1 Indian Reservation Road (IRR)
- 2 Forest Highway (FH)
- 3 Land Management Highway System (LMHS)
- 4 Both IRR and FH
- 5 Both IRR and LMHS
- 6 Both FH and LMHS
- 9 Combined IRR, FH and LMHS

For existing data in WSBIS, do not alter codes. For new records, code zero unless a data source is available.

NBI Commentary:

WSDOT has not been able to identify a source for this data, and will code zeroes for new records until an information source is identified.

WSBIS Item 1487 – Functional Classification**Pulldown**

NBI Item 26

NTI Item C.7

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

For the inventory route, code the functional classification using one of the following codes:

Table 1487 Functional Classification Code

WSDOT Code	NBI Code	NTI Code	Description
1	1	1	Rural Principal Arterial – Interstate
5	2	2	Rural Principal Arterial - Other Freeways or Expressways
2	2	3	Rural Principal Arterial – Other
6	6	4	Rural Minor Arterial
7	7	5	Rural Major Collector
8	8	6	Rural Minor Collector
9	9	7	Rural Local
11	11	1	Urban Principal Arterial – Interstate
12	12	2	Urban Principal Arterial – Other Freeways or Expressways
14	14	3	Urban Principal Arterial - Other
16	16	4	Urban Minor Arterial
17	17	5	Urban Major Collector
18	17	6	Urban Minor Collector
19	19	7	Urban Local

The structure shall be coded rural if not inside a designated urban area. The urban or rural designation shall be determined by the structure location and not the character of the roadway. The WSDOT Functional Classification Map is available at www.wsdot.wa.gov/mapsdata/travel/hpms/functionalclass.htm.

NBI and NTI Commentary:

Functional Classification codes are translated for the NBI and NTI as shown in the table above.

WSBIS Item 1489 – National Truck Network**Pulldown**

NBI Item 110

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

The national network for trucks includes most of the Interstate System and those portions of Federal-aid highways identified in the Code of Federal Regulations (23 CFR 658). The national network for trucks is available for use by commercial motor vehicles of the dimensions and configurations described in these regulations. For the inventory route identified in WSBIS Item 1435, indicate conditions using one of the following codes:

Table 1489 National Truck Network Code

WSBIS Code	NBI Code	Description
N	0	The inventory route is not part of the national network for trucks
Y	1	The inventory route is part of the national network for trucks

WSBIS Item 1490 – Lane Use Direction**Pulldown**

NBI Item 102

NTI Item C.3

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

Code the direction of traffic of the inventory route identified in LRS Route WSBIS Item 1467 as a 1-digit number using one of the codes below. This item must be compatible with other traffic-related items such as WSBIS Item 1352 – Lanes on the Structure, WSBIS Item 1445 – Average Daily Traffic, WSBIS Item 1491 – Total Horizontal Clearance and WSBIS Item 1356 – Curb-to-Curb.

Table 1490 Lane Use Direction Code

WSBIS Code	NBI Code	NTI Code	Description
0	0	0	No highway traffic on inventory route
1	1	1	1 way traffic on inventory route
2	2	2	2 way traffic on inventory route
3	2	3	2 way and reversible traffic on inventory route
4	1	3	Reversible traffic only on inventory route
5	3	4	2 way traffic on 1 lane bridge (curb-to-curb must be <16 ft.)

NBI and NTI Commentary:

WSDOT provides additional codes to address reversible traffic lanes, which are translated to NBI and NTI codes as shown above.

WSBIS Item 1354 – Lanes Under

Pulldown

NBI Item 28B

NTI Item A.3

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

Code the number of lanes under the structure.

For On records, code WSBIS Item 1354 for all lanes under the bridge for all routes that are functionally classified (see WSBIS Item 1487).

For Under records, code WSBIS Item 1354 for only the lanes associated with the inventory route under.

For Tunnels, code all the lanes in the tunnel.

Include all lanes carrying highway traffic (e.g., cars, trucks, buses) which are striped or otherwise operated as a full width traffic lane under the structure. This shall include any full width merge lanes and ramp lanes, and shall be independent of directionality of usage.

WSBIS Item 1491 – Horizontal Clearance, Route Direction (feet & inches)

N(4,0)

WSBIS Item 1495 – Horizontal Clearance, Reverse Direction (feet & inches)

N(4,0)

NBI Item 47

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

The horizontal clearance for the inventory route should be measured and recorded for each opening between restrictive features – curbs, rails, guardrails, walls, piers, slopes, or other structural features limiting the roadway (surface and shoulders).

The purpose of this item is to give the largest available clearance for the movement of wide loads. Flush and mountable medians are not considered to be restrictions. This clearance is defined in two ways:

1. Clear distance between restrictions of the inventory route either on or under the structure.
2. **Edges of** roadway surface **including** shoulders when there are no other restrictions.

When the entire **undivided** inventory route passes **on or under a structure**, code WSBIS Item 1491 **as measured** and WSBIS Item 1495 **is** blank.

When the **divided** inventory route passes **on or under a structure**, code WSBIS Item 1491 and WSBIS Item 1495 as **measured in each direction**. Note that when a bridge pier separates a single route, it is always considered divided.

When the inventory route consists of two parallel bridges carrying a divided route, for the bridge carrying the increasing route direction code WSBIS Item 1491 as measured and WSBIS Item 1495 is blank. For the bridge carrying the decreasing route direction, WSBIS Item 1491 is blank and code WSBIS Item 1495 as measured.

When a restriction is 100 feet or greater, code 9912.

NBI Commentary:

The minimum horizontal clearance for each route is reported to the NBI, regardless of route direction.

Figure 1495

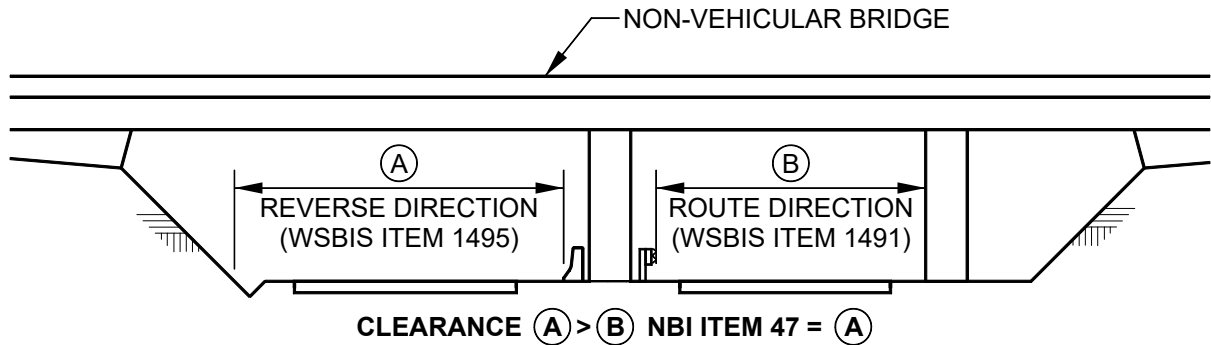
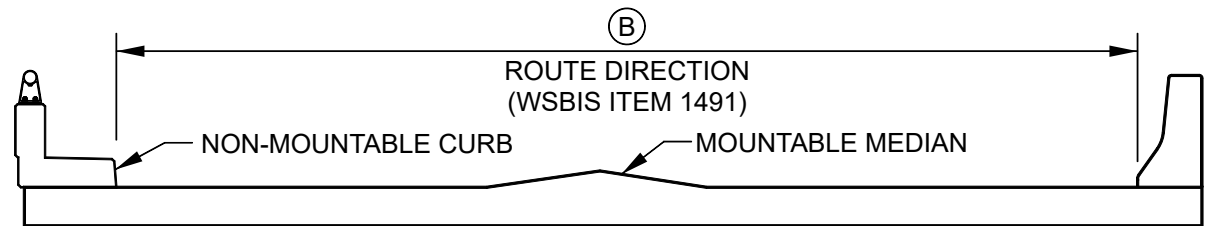
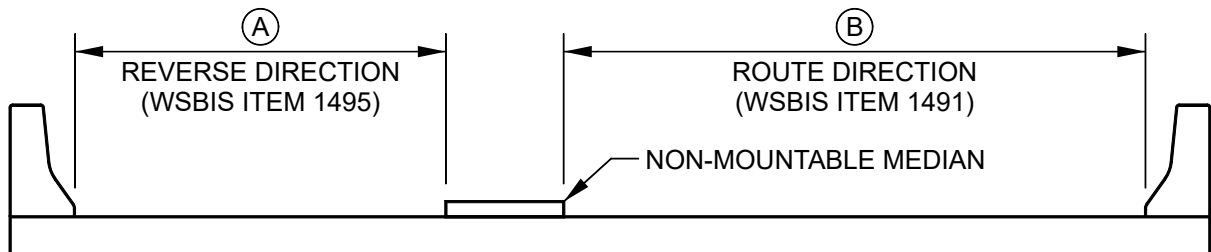


Figure 1



NO MEDIAN OR FLUSH OR MOUNTABLE MEDIAN

Figure 2



RAISED MEDIAN OR NON-MOUNTABLE MEDIAN

(B) > (A) NBI ITEM 47 = (B)

Figure 3

NBI Commentary:

The NBI requires coding only the maximum horizontal clearance for divided highways. WSBIS has two fields. When the NBI submittal is prepared, the largest dimension is selected and reported.

WSBIS Item 1413 – Detour Length**N(2,0)**

NBI Item 19

NTI Item A.7

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

Indicate the actual length to the nearest mile of the detour length, which is considered the additional travel needed to return to the original route if the structure is closed.

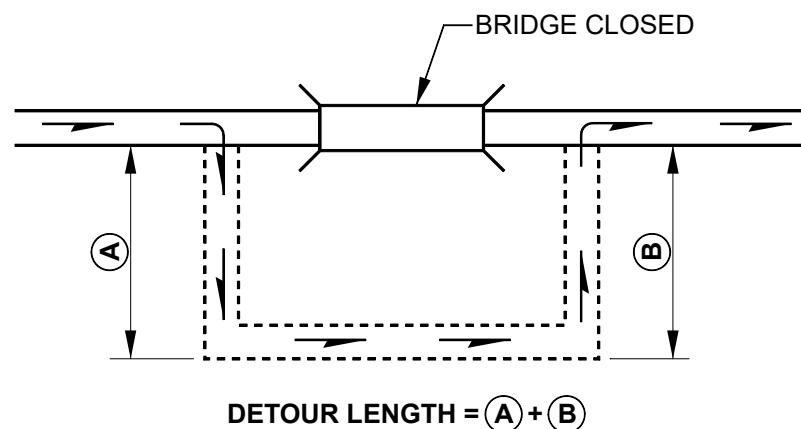
If a ground level bypass is available at the structure site for the inventory route (ramps at a diamond interchange, for example), code the detour length as 0. If the detour exceeds 99 miles, code 99. If the bridge is one of twin bridges and is not at an interchange, code 1 where the other twin bridge can be used as a temporary bypass with a reasonable amount of crossover grading.

Code 0 for routes under a bridge, on the basis that a failed bridge over the route can be removed to allow passage. Routes through tunnels should be the actual detour length.

To the extent practical, the detour route should match the capacity and functionality of the original route. When this is not possible the following minimum standards shall apply:

1. The detour route cannot have weight restrictions lower than the original route.
2. The detour route cannot have vertical clearance limits over the roadway lanes less than 14 feet 3 inches (as measured) unless the original route also has vertical clearance restrictions, in which case the detour cannot further restrict clearances.

Figure 1413

**NBI Commentary:**

This coding guide provides additional direction on how to code routes under the structure, and additional criteria for determining acceptable detour routes.

WSBIS Item 1499 – Maximum Vertical Clearance Route Direction (feet & inches)	N(4,0)
WSBIS Item 2501 – Maximum Vertical Clearance Reverse Direction (feet & inches)	N(4,0)
NBI Item 10	

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

Code the practical maximum vertical clearance over the inventory route identified in WSBIS Item 1435, in the direction of increasing mileposts, whether the route is on the structure or under the structure. This field identifies the minimum vertical clearance for the lane that will carry the highest load. When no **vertical clearance** restriction exists leave this item blank.

To accurately code this field, all vertical clearance measurements for the inventory route must be collected over all lane stripes and at edges of pavement, recorded in a vertical clearance card, and kept on file.

When the entire undivided inventory route passes on or under a structure, code WSBIS Item 1499 as measured and WSBIS Item 2501 is blank.

When the divided inventory route passes on or under a structure, code WSBIS Item 1499 and WSBIS Item 2501 as measured in each direction.

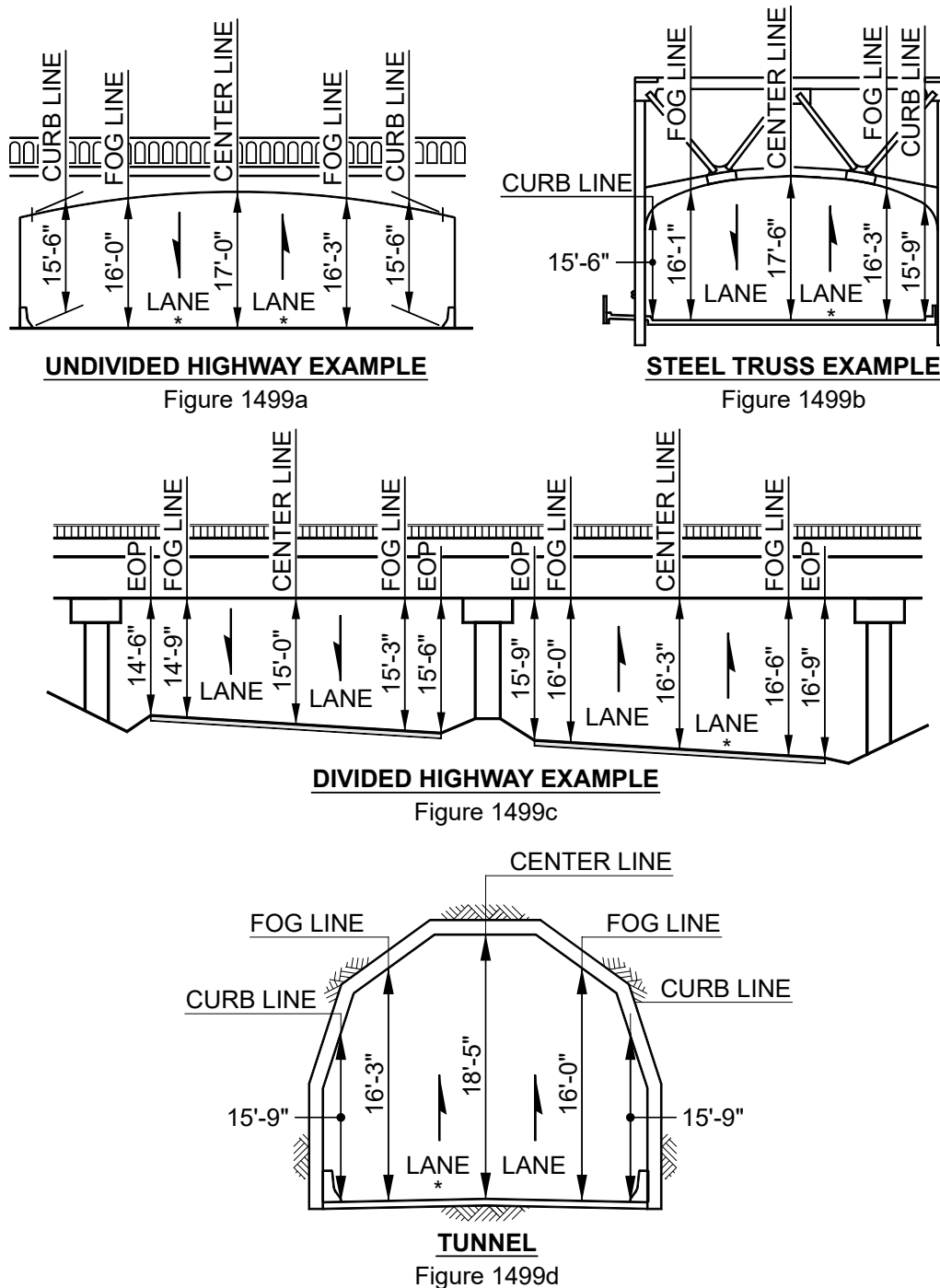
When the inventory route consists of two parallel bridges carrying a divided route, for the bridge carrying the increasing route direction code WSBIS Item 1499 as measured and WSBIS Item 2501 is blank. For the bridge carrying the decreasing route direction, WSBIS Item 1499 is blank and code WSBIS Item 2501 as measured.

When a restriction is 100 feet or greater, code 9912.

NBI Commentary:

The maximum vertical clearance for each route is reported to the NBI, regardless of route direction.

Figure 1499

**NBI Commentary:**

The NBI coding guide indicates that this measurement should be the minimum clearance for a 10 foot width of pavement or travelled part of the roadway. However, from a practical perspective this has been interpreted in this coding guide as the clearance for the lane that will pass the tallest load. The lanes are defined by striping.

Null and 9912 data in WSBIS are translated to 9999 for the NBI submittal.

The NBI requires coding only the maximum vertical clearance for divided highways. WSBIS has two fields. When the NBI submittal is prepared, the largest dimension is selected and reported.

WSBIS Item 2409 – NTI Reportable Flag	Pulldown
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Applicable Structure Types

- All structure records

Indicate if the crossing record is to be included in the National Tunnel Inventory data submittal or not.

For state owned structures, this item is coded by the BPO Information Group and is visible in BridgeWorks Inventory Management mode.

WSBIS Item 2410 – NBI Reportable Flag	Pulldown
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Applicable Structure Types

- All structure records

Indicate if the crossing record is to be included in the National Bridge Inventory data submittal or not.

For state owned structures, this item is coded by the BPO Information Group and is visible in BridgeWorks Inventory Management mode.

WSBIS Item 7479 – Federal Aid Route Number	AN(4)
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Applicable Structure Types

- Local Agency Bridges & culverts carrying public roadways
- Local Agency Pedestrian, RR and other non-vehicular structures over public roadways
- Local Agency Tunnels carrying public roadways within

If the route being inventoried is a federal aid highway, enter its federal aid route number in this field.

Federal Aid Route Numbers are shown on the Statewide National Functional Classification System Maps. These maps are located at local agency planning departments or at WSDOT Service Center Planning.

If the bridge is not on a federal aid highway, the field should be filled with zeros.

WSBIS Item 7441 – Speed Limit (mph)	Integer
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Applicable Structure Types

- Local Agency Bridges & culverts carrying public roadways
- Local Agency Pedestrian, RR and other non-vehicular structures over public roadways
- Local Agency Tunnels carrying public roadways within

Code the speed limit in miles per hour for the inventory route.

Crossing Tab Supplement

WSBIS Item 2000 – Main Listing Flag	Pulldown
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Applicable Structure Types

- All structure records

See Coding Guide Clarifications for a description of the Main Listing Flag.

This item is visible in the BridgeWorks Inventory Management mode.

WSBIS Item 2401– Crossing Manager	Uniqueidentifier
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Applicable Structure Types

- All structure records

The Crossing Manager is the Program Manager responsible for the route identified in WSBIS Item 1435, whether that route is on or under the structure.

For state owned structures, this item is coded by the BPO Information Group and is visible in BridgeWorks Inventory Management mode.

WSBIS Item 2402 – Crossing Description	AN(30)
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Applicable Structure Types

- All structure records maintained by WSDOT Bridge Preservation

This item describes the bridge crossing from the perspective of the inventory route. When a bridge both carries a state route and crosses over another state route, each crossing record will have a separate crossing description:

Main listing On Record crossing description: SR 512 OVER I-5

Secondary listing Under Record crossing description: I-5 UNDER SR 512

For state owned structures, this item is coded by the BPO Information Group and is visible in BridgeWorks Inventory Management mode.

WSBIS Item 2500 – Minimum Vertical Clearance Route Direction (feet & inches)	N(4,0)
WSBIS Item 2502 – Minimum Vertical Clearance Reverse Direction (feet & inches)	N(4,0)

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

Code the practical minimum vertical clearance over the inventory route identified in WSBIS Item 1435, in the direction of increasing mileposts, whether the route is on the structure or under the structure.

For state owned structures, this item is coded by the BPO Information Group and is visible in BridgeWorks Inventory Management mode.

WSBIS Item 2411 – Bridge List**Pulldown****Applicable Structure Types**

- All structure records maintained by WSDOT Bridge Preservation

Indicate if the crossing record is to be included or not in the Bridge List M 23-09.

For state owned structures, this item is coded by the BPO Information Group and is visible in BridgeWorks Inventory Management mode.

Table 2411 Bridge List Code

WSBIS Code	Description
1	The crossing record is included in the Bridge List.
2	The crossing record is NOT included in the Bridge List.

WSBIS Item 2436 – Route Sequencer**Integer****Applicable Structure Types**

- All structure records maintained by WSDOT Bridge Preservation

The route sequencer is a two digit number used for placement of crossing records in the Bridge List M 23-09.

If the inventory route is not included in the bridge list, code 0.

For state owned structures, or structures with crossings managed by the Statewide Program Manager, this item is coded by the BPO Information Group and is visible in BridgeWorks Inventory Management mode.

WSBIS Item 2437 – Bridge List Milepost Override (miles)**N(5,2)****Applicable Structure Types**

- All structure records maintained by WSDOT Bridge Preservation

The bridge list milepost override is used for placement of crossing records in the Bridge List M 23-09.

For state owned structures, or structures with crossings managed by the Statewide Program Manager, this item is coded by the BPO Information Group and is visible in the BridgeWorks Inventory Management mode.

WSBIS Item 2438 – Milepost Sequencer**Integer****Applicable Structure Types**

- All structure records maintained by WSDOT Bridge Preservation

The milepost sequencer is a two digit number used for placement of crossing records in the Bridge List M 23-09.

If the inventory route is not included in the bridge list, code 0.

For state owned structures, or structures with crossings managed by the Statewide Program Manager, this item is coded by the BPO Information Group and is visible in BridgeWorks Inventory Management mode.

WSBIS Item 2468 – Directional Indicator**Pulldown****Applicable Structure Types**

- All structure records maintained by WSDOT Bridge Preservation

The directional indicator specifies if the inventory route carries traffic in the direction of increasing mileposts, decreasing mileposts or both.

- | | |
|---|----------------------------|
| I | Increasing |
| D | Decreasing |
| B | Both |
| * | Null field, does not apply |

For state owned structures, or structures with crossings managed by the Statewide Program Manager, this item is coded by the BPO Information Group and is visible in BridgeWorks Inventory Management mode.

WSBIS Item 2470 – Ahead/Back Indicator**Pulldown****Applicable Structure Types**

- All structure records maintained by WSDOT Bridge Preservation

The ahead/back indicator specifies whether a milepost value is the 'back' (B) duplicate of a milepost value 'ahead' on the route.

- | | |
|---|--|
| B | Back milepost |
| * | Null field, either an Ahead milepost or does not apply |

For state owned structures, or structures with crossings managed by the Statewide Program Manager, this item is coded by the BPO Information Group and is visible in BridgeWorks Inventory Management mode.

Design Tab

WSBIS Item 1532 – Main Span Material

Pulldown

NBI Item 43A

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways

Indicate the kind of material and/or design for the main span.

Table 1532 Main Span Material Code

WSBIS Code	Description
1	Concrete
2	Concrete continuous
3	Steel
4	Steel continuous
5	Prestressed and/or post-tensioned concrete
6	Prestressed and/or post-tensioned concrete continuous
7	Wood or Timber
8	Masonry
9	Aluminum, Wrought Iron, or Cast Iron
0	Other (also to be used when not applicable for approach spans)

WSBIS Item 1533 – Main Span Design

Pulldown

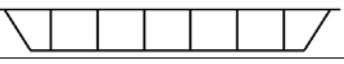

NBI Item 43B

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways

Indicate the predominant type of design and/or type of construction.

Table 1533 Main Span Design Code

WSBIS Code	Description
01	Slab
02	Stringer/Multibeam or Girder
03	Girder and Floorbeam System
04	Tee Beam
05	Box Beam or Girders – Multiple 
06	Box Beam or Girders – Single or Spread 
07	Frame (except frame culverts)
08	Orthotropic
09	Truss – Deck
10	Truss – Thru
11	Arch – Deck
12	Arch – Thru
13	Suspension
14	Stayed Girder
15	Movable – Lift
16	Movable – Bascule
17	Movable – Swing
18	Tunnel (this code designates reporting to the NTI instead of the NBI)
19	Culvert (includes frame culverts)
20*	Mixed types
21	Segmental Box Girder
22	Channel Beam (Bathtub Unit)
00	Other (also to be used when not applicable for approach spans)

*Applicable only to approach spans – WSBIS Item 1536

Examples:

Wood or Timber Through Truss = 710
 Masonry Culvert = 819
 Steel Suspension = 313
 Continuous Concrete Multiple Box Girders = 205
 Simple Span Concrete Slab = 101
 Tunnel in Rock = 018

WSBIS Item 1535 – Approach Span Material**Pulldown**NBI Item 44A

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways

Indicate the type of structure for the approach spans to a major bridge or for the spans where the structural material is different. The codes are the same as for WSBIS Item 1532. If the kind of material is varied, code the most predominant.

Code 0 if this item is not applicable.

WSBIS Item 1536 – Approach Span Design**Pulldown**NBI Item 44B

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways

Indicate the type of structure for the approach spans to a major bridge or for the spans where the structural material is different using Table 1533. Use code 20 when no one type of design and/or construction is predominant for the approach units.

Code 00 if this item is not applicable.

WSBIS Item 2537 – Alpha Span Type (INV MO only)

AN(20)

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways
- Tunnels carrying public roadways within

The alphabetic span type is coded in BridgeWorks application in Inventory Management mode. Use one of the following acronyms:

Table 2537 Alpha Span Type Codes

Alpha Span Type	Description	Alpha Span Type	Description
3SCCulv	3 Sided Concrete Culvert	PTCSeg	Post-Tensioned Segmental Box Girder
3STCulv	3 Sided Timber Culvert	PTCTB	Post-Tensioned Concrete T-Beam
BAS	Bascule Lift Span	SA	Steel Arch
CA	Concrete Arch	SBox	Steel Box Girder
CBox	Concrete Box Girder	SCulv	Steel Culvert
CCulv	Concrete Culvert	SFP	Steel Floating Pontoon
CEFA	Concrete Earth Filled Arch	SG	Steel Girder (weld or rivet)
CESB	Concrete Encased Steel Beam	SLS	Steel Lift Span
CFP	Concrete Floating Pontoon	SRB	Steel Rolled Beam
CG	Concrete Girder	SSCG	Steel Stayed Concrete Girder
CLTun	Concrete Lined Tunnel	SSusS	Steel Suspension Span
CS	Concrete Slab	SSwS	Steel Swing Span
CSS	Cable Stayed Span	STA	Steel Tied Arch
CSTP	Concrete Slab on Timber Piling	STrus	Steel Truss
CTB	Concrete T-Beam	TCulv	Timber Culvert
CTrus	Concrete Truss	TLTun	Timber Lined Tunnel
CVS	Concrete Voided Slab	TS	Timber Slab
LIDTun	Cut and Cover (LID) Tunnel	TTC	Treated Timber (Creosote) Bridge
MCulv	Masonry Culvert	TTLB	Treated Timber Laminated Beam
PCBTG	Prestressed Concrete Bulb-T Girder	TTS	Treated Timber (Salts) Bridge
PCG	Prestressed Concrete Girder	TTTrus	Treated Timber Truss
PCMWG	Prestressed Concrete Multi-Web Girder	UT	Untreated Timber Bridge
PCS	Prestressed Concrete Slab	UTLB	Untreated Timber Laminated Beam
PCTG	Prestressed Concrete Trapezoidal Girder	UTTrus	Untreated Timber Truss
Plaza	Park Plaza Structures	UTun	Unlined Tunnel
PRCB	Precast Reinforced Concrete Beam	WSBox	Weathering Steel Box Girder
PTCBox	Post-Tensioned Concrete Box Girder	WSG	Weathering Steel Girder

WSBIS Item 1538 – Number of Main Spans N(3,0)

NBI Item 45

Applicable Structure Types

- Bridges & culverts carrying public roadways

Record the number of spans in the main or major unit. This item will include all spans of most bridges, the major unit only of a sizable structure, or a unit of material or design different from that of the approach spans.

A span that contains a drop-in span with cantilevers, or two cantilever spans with a hinge, is counted as one span (from pier to pier). Cantilever end spans are counted separately.

WSBIS Item 1541 – Number of Approach Spans N(3,0)

NBI Item 46

Applicable Structure Types

- Bridges & culverts carrying public roadways

Record the number of approach spans to the major bridge, or the number of spans of material different from that of the major bridge.

Code 0 if this item is not applicable.

NBI Commentary:

This coding guide requires coding zeroes when there are no approach spans. The NBI coding guide doesn't provide guidance.

WSBIS Item 1544 – Service On Pull-down

NBI Item 42A

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways

Table 1544 Service On Code

WSBIS Code	Description
1	Highway
2	Railroad
3	Pedestrian-bicycle
4	Highway-railroad
5	Highway-pedestrian
6	Overpass structure at an interchange or second level of a multilevel interchange
7	Third level (Interchange)
8	Fourth level (Interchange)
9	Building or plaza
0	Other

WSBIS Item 1545 – Service Under
NBI Item 42B

Pulldown

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways

Table 1545 Service Under Code

WSBIS Code	Description
1	Highway, with or without pedestrian
2	Railroad
3	Pedestrian-bicycle
4	Highway-railroad
5	Waterway
6	Highway-waterway
7	Railroad-waterway
8	Highway-waterway-railroad
9	Relief for waterway
0	Other

WSBIS Item 1546 – Deck Type

Pulldown

NBI Item 107

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways*

Record the type of deck system on the bridge. If more than one type of deck system is on the bridge, code the most predominant. Code A for a filled culvert or arch with the approach roadway section carried across the structure.

*Main Listing Under records (e.g., railroad bridges and pedestrian bridges) are to be coded N, with the following exception: WSDOT owned pedestrian bridges are to be coded with the appropriate Deck Type.

Use one of the following codes:

Table 1546 Deck Type Code

WSBIS Code	NBI Code	Description
1	1	Concrete Cast-in-Place
2	2	Concrete Precast Panels
3	3	Steel Grating – Open
4	4	Steel Grating – Filled with Concrete
5	5	Steel plate (includes orthotropic)
6	6	Corrugated Steel
7	7	Aluminum
8	8	Treated timber
9	8	Untreated timber
0	9	Other
A	N	Filled arches / Culverts
B	9	Precast integral with beam
N	N	Bridges with no deck

NBI Commentary:

WSDOT provides additional codes which are translated to NBI codes as shown above.

WSBIS Item 1547 – Wearing Surface**Pulldown**

NBI Item 108A

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways*

*Main Listing Under records (e.g., railroad bridges and pedestrian bridges) are to be coded N, with the following exception: WSDOT owned pedestrian bridges are to be coded with the appropriate Wearing Surface.

Table 1547 Wearing Surface Code

WSBIS Code	Description
1	Monolithic Concrete (concurrently placed with structural deck)
2	Integral Concrete (separate non-modified layer of concrete added to structural deck)
3	Latex Concrete or similar additive
4	Low Slump Concrete
5	Epoxy Overlay
6	Bituminous (ACP or BST)
7	Timber
8	Gravel
9	Other
0	None (no additional concrete thickness or wearing surface is included in the bridge deck)
N	Bridges with no deck

WSBIS Item 1548 – Membrane**Pulldown**

NBI Item 108B

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways*

*Main Listing Under records (e.g., railroad bridges and pedestrian bridges) are to be coded N, with the following exception: WSDOT owned pedestrian bridges are to be coded with the appropriate Membrane.

Table 1548 Membrane Code

WSBIS Code	Description
1	Built-up
2	Preformed Fabric
3	Epoxy
8	Unknown
9	Other
0	None
N	Bridges with no deck

WSBIS Item 1549 – Deck Protection**Pulldown**

NBI Item 108C

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Pedestrian, RR and other non-vehicular structures over public roadways*

*Main Listing Under records (e.g., railroad bridges and pedestrian bridges) are to be coded N, with the following exception: WSDOT owned pedestrian bridges are to be coded with the appropriate Membrane.

Table 1549 Deck Protection Code

WSBIS Code	Description
1	Epoxy Coated Reinforcing
2	Galvanized Reinforcing
3	Other Coated Reinforcing
4	Cathodic Protection
6	Polymer Impregnated
7	Internally Sealed
8	Unknown
9	Other
0	None
N	Bridges with no deck

WSBIS Item 1550 – Design Load

Pulldown

NBI Item 31

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Use the codes below to indicate the live load for which the structure was designed. The numerical value of the railroad loading should be recorded on the form. Classify any other loading, when feasible, using the nearest equivalent of the loadings given below.

Table 1550 Design Load Code

WSBIS Code	Metric Description	English Description
0	Unknown	Unknown
1	M 9	H 10
2	M 13.5	H 15
3	MS 13.5	HS 15
4	M 18	H 20
5	MS 18	HS 20
6	MS 18 + Mod	HS 20 + Mod
7	Pedestrian	Pedestrian
8	Railroad	Railroad
9	MS 22.5 or greater	HS 25 or greater
A	HL 93	HL 93
B	Greater than HL 93	Greater than HL 93
C	Other	Other

NBI Commentary:

This field has been revised based on a February 2, 2011 FHWA memo available at www.fhwa.dot.gov/bridge/110202.cfm.

WSBIS Item 1585 – Border Bridge State Code

Pulldown

NBI Item 98A

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Use this item to indicate structures crossing to Oregon or Idaho. Code a 3-digit number specifying the border state. See [WSBIM Appendix 2-F for a listing of border bridges on the Washington State inventory](#).

Leave blank if the structure does not cross a state border.

The neighboring state codes are:

Oregon	410
Idaho	160

NBI Commentary:

This field has been limited to codes relevant to Washington State.

[WSBIS Items 1585, 1588 and 1590 reflect the intent of the February 9, 2018 FHWA Memo entitled “Border Bridges in the NBI.”](#)

WSBIS Item 1588 – Border Bridge Percent	N(2,0)
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NBI Item 98B

Applicable Structure Types

- Bridges & culverts carrying public roadways

Code a 2-digit number specifying the percentage of total deck area of the existing bridge that the neighboring State is responsible for funding.

Leave blank if the structure does not cross a state border.

WSBIS Item 1590 – Border Bridge Structure Identifier	AN(15)
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NBI Item 99

Applicable Structure Types

- Bridges & culverts carrying public roadways

Code the neighboring State's 15-digit National Bridge Inventory structure number for any structure noted in WSBIS Item 1585 – Border Bridge. This number must match exactly the neighboring State's submitted NBI structure number. The entire 15-digit field must be accounted for including zeroes and blank spaces whether they are leading, trailing, or embedded in the 15-digit field.

Leave blank if the structure does not cross a state border.

WSBIS Item 7565 – Federal Aid Project Number	AN(20)
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Applicable Structure Types

- Bridges & culverts carrying public roadways

This is the most recent federal aid project number under which federal funds have been used for construction or reconstruction from the year 1970 forward. Left justify and leave unused columns blank. If the construction work has been assigned more than one federal aid project number, enter the number for the most recently completed (or current) portion of the project. If federal funds have not been used, leave the field blank.

WSBIS Item 7557 – Design Exception Date	Date
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Applicable Structure Types

- Bridges & culverts carrying public roadways

If a design exception has been granted by the FHWA to permit a deviation from required standards, this is the effective date of FHWA approval. For example, if approval to build a one-lane bridge on a low volume road was granted, enter the date approval was given for this exception. If no design exception has been granted, leave this field blank.

Load Rating Tab

WSBIS Item 2580 – Reference Inspection Date	Date
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Applicable Structure Types

- Bridges & culverts carrying public roadways
- Tunnels carrying public roadways within

Code the inspection report date used for the load rating calculations. Usually this field will be coded or updated by transcribing information from the most current Load Rating Summary Sheet.

WSBIS Item 2581 – Load Rating Date	Date
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Applicable Structure Types

- Bridges & culverts carrying public roadways
- Tunnels carrying public roadways within

Code the load rating calculation date. Usually this field will be coded or updated by transcribing information from the most current Load Rating Summary Sheet.

WSBIS Item 2582 – Rated By	AN(16)
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Applicable Structure Types

- Bridges & culverts carrying public roadways
- Tunnels carrying public roadways within

Code the initials or engineering firm name indicating who performed the load rating. Usually this field will be coded or updated by transcribing information from the most current Load Rating Summary Sheet.

WSBIS Item 1551 – Operating Rating Method	Pulldown
NBI Item 63	
WSBIS Item 1554 – Inventory Rating Method	Pulldown
NBI Item 65	
NTI Item L.1	

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Tunnels carrying public roadways within

Code these fields with one of the following codes to indicate which load rating method was used to determine the rating for this bridge.

Table 1551 Operating and Inventory Rating Method Code

WSBIS Codes		NTI Codes	Description
Used by WSDOT	Used by Local Agencies		
N	N	N	No load rating required (only applicable to some tunnels)
0	0	0	Field evaluation and documented engineering judgment reported in tons using HS20 loading
1	1	-	Load Factor (LF) reported in tons using HS20 loading
2	2	-	Allowable Stress (AS) reported in tons using HS20 loading
-	3	-	Load and Resistance Factor (LRFR) reported in tons
4	4	-	Load Testing reported in tons using HS20 loading
5	5	5	No rating analysis or evaluation performed
-	6	1	Load Factor (LF) rating reported by rating factor using HS20 loading
-	7	2	Allowable Stress (AS) rating reported by rating factor using HS20 loading
8	8	3	Load and Resistance Factor Rating (LRFR) reported by rating factor using HL93 loading
F	-	A	Assigned rating method based on Load and Resistance Factor Design (LRFD) reported by rating factor using HL93 loading

Note: WSDOT uses codes 0, 1, 2, 4, 5, 8 and F for bridges and culverts carrying public roadways. Local Agencies uses codes 0 through 8 for bridges and culverts carrying public roadways. For tunnels carrying public roadways within, all agencies use WSBIS codes 0, 1, 2, 3, 5, A and N.

Code 0 is to be used when the load rating is determined by field evaluation and documented engineering judgment, typically done when plans are not available for concrete structures or in cases of severe deterioration. Field evaluation and engineering judgment ratings must be documented. See Chapter 5 for additional guidance.

Code 5 is to be used when the structure has not been load rated or load rating documentation does not exist.

NBI and NTI Commentary:

WSBIS Item 1551 has been modified based on a November 15, 2011 FHWA Memo available at www.fhwa.dot.gov/bridge/nbi/111115.cfm.

The NTI does not report load ratings in tons, only rating factors. This restricts load rating methods to only those that report in rating factors. Also, the NTI has only one field to assign the load rating method for both inventory and operating methods. WSBIS has chosen to use the NBI Inventory rating method for reporting to the NTI.

Codes A through E are not available in WSBIS because there are no agencies which use these methods.

WSBIS Item 1552 – Operating Rating Tons	N(3,0)
NBI Item 64	
WSBIS Item 1555 – Inventory Rating Tons	N(3,0)
NBI Item 66	

Applicable Structure Types

- Bridges & culverts carrying public roadways

WSDOT enters rating data into the database as English tonnage for all cases noted in WSBIS Items 1551 and 1554 which have methods coded 0 through 4. For methods coded 5 through 8 or F, use WSBIS Items 1553 and 1556 to enter the rating factor.

WSDOT enters rating tons as a 2-digit number. For values greater than 99 tons, enter 99.

If the bridge will not carry a minimum of 3 tons of live load, the operating rating tons shall be coded 0; and, consistent with the direction of the AASHTO Manual, it shall be closed.

The use or presence of a temporary bridge requires special consideration in coding. In such cases, since there is no permanent bridge, the inventory and operating rating tons should be coded 0 even though the temporary structure is rated for as much as full legal load.

A bridge shored up or repaired on a temporary basis is considered a temporary bridge and the inventory and operating rating tons shall be coded as if the temporary shoring were not in place. See WSBIS Item 1289 – Temporary Structure Designation for definition of a temporary bridge.

For a bridge that is closed (WSBIS Item 1293 is coded K), operating and inventory rating tons shall be coded 0.

Code 99 for a structure under sufficient fill such that, according to AASHTO design, the live load stress on the structure is insignificant in the structure load capacity.

NBI Commentary:

WSBIS Items 1552 and 1555 have been modified based on a March 22, 2004, FHWA Memo available at www.fhwa.dot.gov/bridge/nbi/111115.cfm.

Note: This field is no longer restricted to reporting HS20 loads only – by WSBIS Item 1551 definition, in some cases HL93 load cases are reported here. Additional clarification on how to code these fields was also added.

When this 3-digit number is reported in the NBI submittal, the FHWA multiplies it by 32.4 and rounds it to tenths. This number represents metric tons. Due to the fact the FHWA cannot currently process metric tons greater than 99.9, any rating factor greater than 3.08 is truncated to 99.9 metric tons upon conversion.

WSBIS Item 1553 – Operating Rating Factor	N(4,2)
NBI Item 64	
NTI Item L.3	
WSBIS Item 1556 – Inventory Rating Factor	N(4,2)
NBI Item 66	
NTI Item L.2	

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Tunnels carrying public roadways within

WSDOT enters rating data as factors for all cases noted in WSBIS Items 1551 and 1554 which have methods coded 5 through 8 or F. For methods coded 0 through 4, use WSBIS Items 1552 and 1555 to enter rating tonnage.

If WSBIS Item 1551 – Operating Rating Method has been coded 5, for new structures, the operating rating shall be coded with a rating factor of 1.30.

If WSBIS Item 1554 – Inventory Rating Method has been coded 5, for new structures, the inventory rating shall be coded with a rating factor of 1.00.

NBI Commentary:

When this number is reported in the NBI submittal, rating factors in excess of 9.99 will be reported to FHWA as 9.99.

WSBIS Item 2587 – Type 3 Rating Factor	N(4,2)
WSBIS Item 2588 – Type 3S2 Rating Factor	N(4,2)
WSBIS Item 2589 – Type 3-3 Rating Factor	N(4,2)
WSBIS Item 2590 – Notional Rating Load (NRL) Rating Factor	N(4,2)

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Tunnels carrying public roadways within

Code the rating factors for the AASHTO legal load trucks as defined within the AASHTO *Manual for Bridge Evaluation* (MBE) Section 6. If the Load Factor or Working Stress method is used to rate this structure, enter the Operating Rating factor only.

Usually these fields will be coded or updated by transcribing information from the most current Load Rating Summary Sheet.

WSBIS Item 2591 – Single Unit 4 (SU4) Rating Factor	N(4,2)
WSBIS Item 2592 – Single Unit 5 (SU5) Rating Factor	N(4,2)
WSBIS Item 2593 – Single Unit 6 (SU6) Rating Factor	N(4,2)
WSBIS Item 2594 – Single Unit 7 (SU7) Rating Factor	N(4,2)

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Tunnels carrying public roadways within

Code the rating factor for the AASHTO legal load trucks as defined within the AASHTO *Manual for Bridge Evaluation* (MBE) Section 6. If the Load Factor or Working Stress method is used to rate this structure, enter the Operating Rating factors only.

Usually these fields will be coded or updated by transcribing information from the most current Load Rating Summary Sheet.

These fields can be null if WSBIS Item 2590 (NRL) is populated and equal to or greater than 1.00.

WSBIS Item 2598 – Emergency Vehicle 2 (EV2) Rating Factor	N(4,2)
WSBIS Item 2599 – Emergency Vehicle 3 (EV3) Rating Factor	N(4,2)

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Tunnels carrying public roadways within

Code the rating factor for the Emergency Vehicle legal load trucks as defined within the *Bridge Design Manual* M 23-50.14, Chapter 13. If the Load Factor or Working Stress method is used to rate this structure, enter the Operating Rating factors only.

Usually these fields will be coded or updated by transcribing information from the most current Load Rating Summary Sheet.

These fields can be null if the structure has not been rated for these loads.

WSBIS Item 2596 – Overload 1 (OL-1) Rating Factor	N(4,2)
WSBIS Item 2597 – Overload 2 (OL-2) Rating Factor	N(4,2)

Applicable Structure Types

- Bridges & culverts carrying public roadways
- Tunnels carrying public roadways within

Code the rating factor for the WSDOT permit loads as defined within the *Bridge Design Manual* Chapter 13. If the Load Factor or Working Stress method is used to rate this structure, enter the Operating Rating factors only.

Usually this field will be coded or updated by transcribing information from the most current Load Rating Summary Sheet.

For local agencies, the following fields are mirrored in other tabs:

ADT	crossing tab
Truck percent	crossing tab
Design load code	design tab
Superstructure	NBI tab
Substructure	NBI tab
Culvert	NBI tab
Asphalt depth	NBI tab
Revise rating	NBI tab
Load rating note	(see Chapter 3)
Operating level note	NBI tab
Revise rating note	NBI tab

For these fields, see the applicable tab for field definitions.

Waterway Tab

WSBIS Item 7832 – Water Type	Pulldown
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Applicable Structure Types

- **Local Agency Bridges & culverts carrying public roadways**

This field describes the type of water the bridge crosses over.

- | | |
|---|---|
| B | Brackish (a mixture of fresh and salt water). |
| F | Fresh water. |
| S | Salt water. |
| T | Tidal. |

Leave blank if not over water.

WSBIS Item 7833 – Flood Plain Intrusion	Pulldown
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Applicable Structure Types

- **Local Agency Bridges & culverts carrying public roadways**

This code indicates whether or not the structure's approach roadway or abutment intrude into the flood plain of the waterway (i.e., whether or not previous or possible flooding could cause or has caused water to rise so it touches the structure's approach roadway embankment or abutment).

- | | |
|---|---|
| A | No intrusion into the flood plain. |
| B | Bridge or approaches intrude into the waterway causing minor backwater. |
| C | Overtopping of approach roadway has occurred. |
| D | A portion of the superstructure has been under water. |
| U | Flood plain intrusion is unknown. |

Leave blank if not over water.

WSBIS Item 7834 – Flood Control	Pulldown
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Applicable Structure Types

- **Local Agency Bridges & culverts carrying public roadways**

This field indicates if there is any existing type of flood control on the waterway under the bridge. To be considered, this flood control must be in place either upstream or downstream from the bridge and must be near enough to have an effect on the bridge. Flood control may be provided by dams, dikes, fill, or other means.

- | | |
|---|-------------------------------|
| B | Both upstream and downstream. |
| U | Upstream. |
| D | Downstream. |
| N | No flood control. |

Leave blank if not over water.

WSBIS Item 7835 – Scour History	Pulldown
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Applicable Structure Types

- **Local Agency Bridges & culverts carrying public roadways**

This code describes scour conditions at the bridge site.

- | | |
|---|--|
| C | Current scour problems. |
| H | History of scour problems but scour conditions are now stable. |
| N | No history of scour. |
| U | Scour history is unknown. |

Leave blank if not over water.

WSBIS Item 7836 – Streambed Material Type	Pulldown
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Applicable Structure Types

- **Local Agency Bridges & culverts carrying public roadways**

This code describes the composition of the streambed at the bridge site.

Enter one of the following codes to indicate the predominant type of material that is evident.

- | | |
|---|--------------|
| 1 | Bedrock |
| 2 | Sediment |
| 3 | Gravel |
| 4 | Sand |
| 5 | Cobbles |
| 6 | Lined Canal |
| 7 | Vegetation |
| 8 | Alluvial Fan |
| 9 | Unknown |

Leave blank if not over water.

WSBIS Item 7837 – Substructure Stability	Pulldown
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Applicable Structure Types

- **Local Agency Bridges & culverts carrying public roadways**

This code describes the type of material upon which the bridge's substructure rests. This code is used to determine the degree of stability that can be expected in the bridge substructure.

Code the lower number value If different sections of a continuous span bridge are supported by different materials.

- | | |
|---|------------------------------------|
| 1 | Spread footing, simple spans. |
| 2 | Spread footing, continuous spans. |
| 3 | Pile foundation, simple spans. |
| 4 | Pile foundation, continuous spans. |
| 5 | Bedrock, simple spans. |
| 6 | Bedrock, continuous spans. |
| 7 | Unknown, simple spans. |
| 8 | Unknown, continuous spans |

Leave blank if not over water.

WSBIS Item 7838 – Waterway Obstruction**Pulldown****Applicable Structure Types**

- **Local Agency Bridges & culverts carrying public roadways**

This code indicates any conditions in the waterway which affect the flow of water beneath the bridge.

- A Debris accumulates at the bridge.
- B Ice accumulates at the bridge.
- C The waterway is overgrown with vegetation.
- D A and C above.
- E A and B above.
- F B and C above.
- G A, B, and C above.
- N No obstruction to the flow of water beneath the bridge.

Leave blank if not over water.

WSBIS Item 7839 – Streambed Stability**Pulldown****Applicable Structure Types**

- **Local Agency Bridges & culverts carrying public roadways**

This code describes any existing stream conditions which may influence scour at the bridge site.

- A Sharp bends.
- B Significant lateral shifts.
- C Steep slopes.
- D High water velocity.
- E Degradation.
- F Aggradation.
- G No conditions influencing scour exist.
- H Streambed conditions are unknown.

Leave blank if not over water.

WSBIS Item 7840 – Streambed Anabranch**Pulldown****Applicable Structure Types**

- **Local Agency Bridges & culverts carrying public roadways**

This field indicates whether or not confluences or shifting anabranches are present in the waterway. A confluence is a flowing together of two or more streams. An anabranch is a river branch that re-enters the main stream, creating an island in the waterway.

Code only those conditions which exist near the bridge site.

- A Anabranches are present.
- B Both anabranches and confluences are present.
- C Confluences are present.
- N Neither anabranches nor confluences are present.
- U Waterway configuration is unknown.

Leave blank if not over water.

WSBIS Item 7841 – Piers in Water

Pulldown**Applicable Structure Types**

- **Local Agency Bridges & culverts carrying public roadways**

This field contains the number of the structure's piers in the water at normal yearly high water.

If the bridge is inspected at low water, look for evidence that the piers or pile bents have been in the water.

- 0 No piers in the water.
- 1-9 Number of piers in the water.
- M More than nine piers in the water.

Leave blank if not over water.

Proposed Improvements Tab

WSBIS Item 2883 – Proposed Improvement Calculation	Check Box
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This checkbox directs the WSBIS system to compute costs for any proposed bridge improvements. It is checked by default for all structures. To prevent automatic calculation and to perform manual entry, uncheck the box.

The following method is used to perform the automatic calculation:

If Work Type 31 or 32 is chosen:

Work Method = 1

Structure Length = Bridge Length + 10 feet

Roadway Width = (Lanes On x 12 feet) + 14 feet

Cost per SF of Deck = \$800 (as of 2014)

Structure Cost = 0.50 x Total Cost

Roadway Cost = 0.10 x Total Cost

Engineering & Misc Cost = 0.4 x Total Cost

Total Cost = (Structure Imp Length x Prop Roadway Width) x Cost Per SF of Prop Deck

Estimate Year = (current year)

If Work Type 33 through 38 is chosen:

Work Method = 1

Structure Length = Bridge Length

Roadway Width = Approach Roadway Width + 2 feet

Cost per SF of Deck = \$400 (as of 2014)

Structure Cost = 0.50 x Total Cost

Roadway Cost = 0.10 x Total Cost

Engineering & Misc Cost = 0.40 x Total Cost

Total Cost = (Structure Imp Length x Prop Roadway Width) x Cost Per SF of Prop Deck

Estimate Year = (current year)

WSBIS Item 1844 – Work Type

Pulldown

NBI Item 75A

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Use one of the following codes to represent the proposed work type:

Table 1844 Work Type Code

WSBIS Code	Description
38	Other structural work, including hydraulic replacements.
37	Bridge deck replacement with only incidental widening.
36	Bridge deck rehabilitation with only incidental widening.
35	Bridge rehabilitation because of general structure deterioration or inadequate strength.
34	Widening of existing bridge with deck rehabilitation or replacement.
33	Widening of existing bridge or other major – structure without deck rehabilitation or replacement; includes culvert lengthening.
32	Replacement of bridge or other structure because of relocation of road.
31	Replacement of bridge or other structure because of substandard load carrying capacity or substandard bridge roadway geometry.

WSBIS Item 1846 – Work Method

Pulldown

NBI Item 75B

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Use one of the following codes to indicate whether the proposed work is to be done by contract or by force account:

Table 1846 Work Method Code

WSBIS Code	Description
2	Work to be done by owner's forces
1	Work to be done by contract

WSBIS Item 1847 – Structure Length (feet)

N(6,0)

NBI Item 76

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Code the length of the proposed bridge improvement to the nearest foot. For replacement or rehabilitation of the entire bridge, the length should be back to back of backwalls of abutments or from pavement notch to pavement notch. For replacement or rehabilitation of only part of the structure, use the length of the portion to be improved.

For culvert improvements, use the proposed length measured along the centerline of the barrel regardless of the depth below grade. The measurement should be made between the inside faces of the top parapet or edge-stiffening beam of the top slab.

WSBIS Item 2853 – Roadway Width (feet)	N(6,0)
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Code the curb-to-curb width of the roadway on the proposed bridge. This measurement is coded to the nearest foot.

WSBIS Item 2860 – Cost per S.F. of Deck (dollars)	N6,0)
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Code the estimated cost per square foot of proposed deck. For State bridges, this number is provided by the WSDOT Bridge Management Engineer.

WSBIS Item 1867 – Structure Cost (thousand dollars)	N(7,0)
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NBI Item 94

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Code a number to represent the estimated cost of the proposed bridge improvements (including replacement) in thousands of dollars. This cost does not include roadway, right of way, detour, demolition, or preliminary engineering costs.

NBI Commentary:

WSBIS allows up to seven digits each for Structure, Roadway and Total Costs (in thousands of dollars). Amounts coded greater than six digits will be converted to 999999 for the NBI data submittal.

WSBIS Item 1873 – Roadway Cost (thousand dollars)	N(7,0)
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NBI Item 95

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Code a number to represent the cost of the proposed roadway improvement in thousands of dollars. This shall include only roadway construction costs, excluding bridge, right-of-way, detour, extensive roadway realignment costs, preliminary engineering, etc. Do not use this item for estimating maintenance costs.

NBI Commentary:

WSBIS allows up to seven digits each for Structure, Roadway and Total Costs (in thousands of dollars). Amounts coded greater than six digits will be converted to 999999 for the NBI data submittal.

WSBIS Item 2870 – Engineering and Miscellaneous Cost (thousand dollars)	N(7,0)
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Code the estimated cost of engineering and other miscellaneous items. For State bridges, this number is provided by the WSDOT Bridge Management Engineer.

WSBIS Item 1861 – Total Cost (thousand dollars)	N(7,0)
--	---------------

NBI Item 96

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Code a number to represent the total project cost in thousands of dollars, including incidental costs not included in Structure Cost and Roadway Cost. This item should include all costs normally associated with the proposed bridge improvement project. The Total Project Cost will therefore usually be greater than the sum of Structure and Roadway Costs.

NBI Commentary:

WSBIS allows up to seven digits each for Structure, Roadway and Total Costs (in thousands of dollars). Amounts coded greater than six digits will be converted to 999999 for the NBI data submittal.

WSBIS Item 1879 – Estimate Year	N(4,0)
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NBI Item 97

Applicable Structure Types

- **Bridges & culverts carrying public roadways**

Code the year that the costs of proposed work were estimated. The data provided for these items must be current; that is, the estimate year shall be no more than 8 years before the current year.

Tunnel Supplement Tab

WSBIS Item 1992 – Routine Inspection Target Date	Date
NTI Item D.1	

Applicable Structure Types

- Tunnels carrying public roadways within

The target date is set by the program manager and cannot be modified without prior notification to the FHWA division office.

This date is intended to provide the baseline for scheduling future routine inspections. Routine inspection dates should be within 2 months (+/-) of this target month. The year represents the target date was set.

Tunnel ID Tab

WSBIS Item 1022 – Urban Code

Pulldown

Applicable Structure Types

- Tunnels carrying public roadways within

Record the urbanized area code:

Table 1022 Urban Code

WSBIS Code	Urban Area Name
Urban Areas with Populations of 50,000 or more as of 2017	
06652	Bellingham-Ferndale
09946	Bremerton-Port Orchard-Bainbridge Island
44479	Kennewick-Pasco-Richland
49312	Lewiston-Clarkston
51283	Longview-Kelso
55333	Marysville-Tulalip
60490	Mount Vernon-Burlingto-Sedro-Woolley
65242	Olympia-Lacey-Tumwater
80389	Seattle-Tacoma-Everett
83764	Spokane-Spokane Valley
71317	Vancouver-Camas-Battle Ground
91405	Walla Walla-Milton-Freewater
93862	Wenatchee-East Wenatchee
97507	Yakima-Selah-Union Gap
Urban Areas with Populations of 5,000 - 49,000 as of 2017	
99998	Aberdeen-Hoquiam
99998	Anacortes
99998	Birch Bay-Blaine
99998	Camano Island
99998	Centralia-Chehalis
99998	Chelan-Manson
99998	Cheney
99998	Ellensburg
99998	Ephrata
99998	Grandview
99998	Granite Falls
99998	Indianola-Kingston
99998	Lynden
99998	Montesano-Elma
99998	Moses Lake
99998	Oak Harbor
99998	Ocean Shores
99998	Omak-Okanogan
99998	Othello
99998	Port Angeles
99998	Port Townsend
99998	Pullman

Table 1022 Urban Code

WSBIS Code	Urban Area Name
99998	Quincy
99998	Sequim
99998	Shelton
99998	Snoqualmie-North Bend
99998	Stanwood
99998	Sultan-Gold Bar
99998	Sunnyside
99998	Toppenish-Zillah
99998	Wapato
99998	Woodland
99998	Yelm
All Other Locations	
99999	Non Urbanized area

Load Rating Tab Supplement

WSBIS Item 1560 – Posted Load – Gross	N(2,0)
NTI Item L.5	
WSBIS Item 1561 – Posted Load – Axle	N(2,0)
NTI Item L.6	
WSBIS Item 1562 – Posted Load – Type 3	N(2,0)
NTI Item L.7	
WSBIS Item 1563 – Posted Load – Type 3S2	N(2,0)
NTI Item L.8	
WSBIS Item 1564 – Posted Load – Type 3-3	N(2,0)
NTI Item L.9	

Applicable Structure Types

- Tunnels carrying public roadways within

Record the gross weight limits shown on the load posting sign or signs rounded down to the nearest US ton. Leave this item blank if there is no load posting sign.

Layout Tab Supplement

WSBIS Item 1543 – Service In Tunnel	Pulldown
NTI Item A.8	

Applicable Structure Types

- Tunnels carrying public roadways within

Record the type of service for the route in the tunnel using one of the following codes:

Table 1543 Service In Tunnel Code

WSBIS Code	Description
1	Highway
2	Highway and Railroad
3	Highway and Pedestrian
4	Highway, Railroad, and Pedestrian
5	Other

Use code 0 when the tunnel carries both directions of a divided highway, and when the roadway is undivided. Route direction is considered the designated direction of the route, not geographic orientation.

WSBIS Item 1349 – Tunnel Length (feet)	N(5,0)
NTI Item G.1	

Applicable Structure Types

- Tunnels carrying public roadways within

Record the length of the tunnel to the nearest foot measured along the centerline of the roadway.

When a tunnel is divided into segments, record the length of the segment. For example: if a 1000 foot tunnel is divided into 4-250 foot segments, each segment will have a tunnel length of 250 feet.

When multiple bores are reported as a single tunnel, record the length of the longest bore.

WSBIS Item 1510 – Number of Tunnel Bores	Pulldown
NTI Item S.1	

Applicable Structure Types

- Tunnels carrying public roadways within

Record the number of bores in the tunnel.

Figure WSBIS 1510a Two Bores

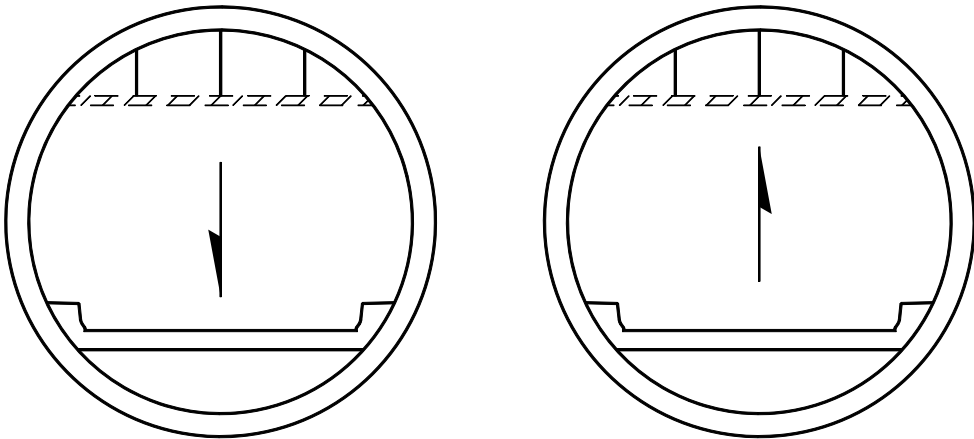
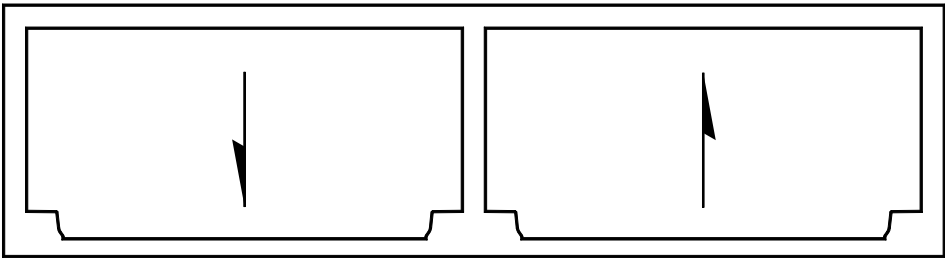


Figure WSBIS 1510b One Bore



WSBIS Item 1511 – Tunnel Shape

Pulldown

NTI Item S.2

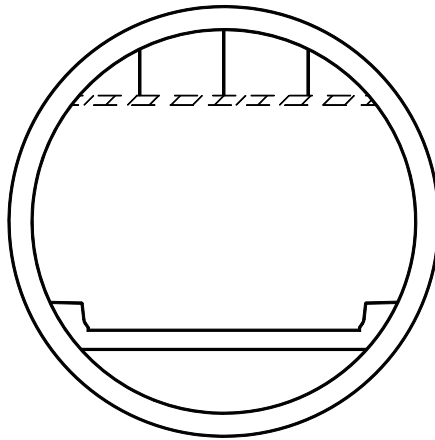
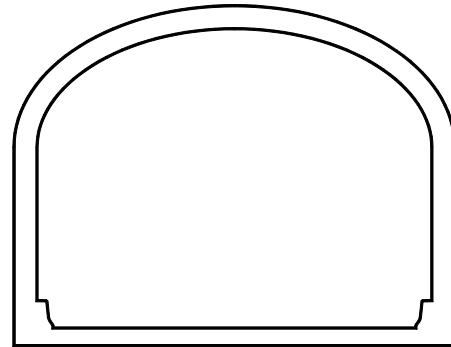
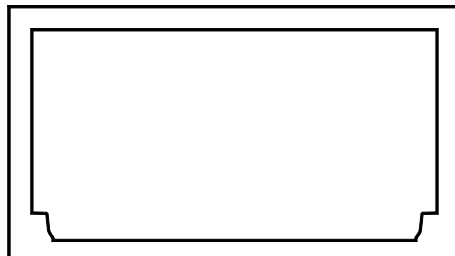
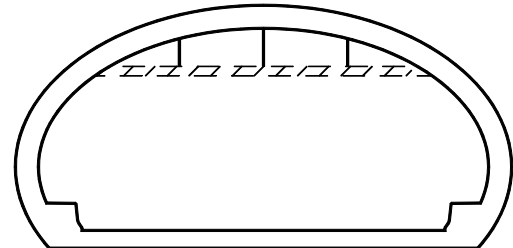
Applicable Structure Types

- Tunnels carrying public roadways within

Record the tunnel shape using one of the following codes:

Table 1511 Tunnel Shape Code

WSBIS Code	Description
1	Oval
2	Horseshoe
3	Rectangular
4	Circular

Figure WSBIS 1511a Circular Tunnel**Figure WSBIS 1511b** Horseshoe Tunnel**Figure WSBIS 1511c** Rectangular Tunnel**Figure WSBIS 1511d** Oval Tunnel

WSBIS Item 1512 – Portal Shape

Pulldown

NTI Item S.3

Applicable Structure Types

- Tunnels carrying public roadways within

Record the portal shape using one of the following codes:

Table 1512 Portal Shape Code

WSBIS Code	Description
1	Oval
2	Horseshoe
3	Rectangular
4	Circular
5	Other

See example shapes shown for WSBIS 1511 Tunnel Shape.

WSBIS Item 1513 – Ground Conditions

Pulldown

NTI Item S.4

Applicable Structure Types

- Tunnels carrying public roadways within

Record the ground conditions using one of the following codes:

Table 1513 Ground Conditions Code

WSBIS Code	Description
1	Soil
2	Rock
3	Mixed Face

Soil is used to define ground conditions consisting primarily of clay, silt, sand, gravel or a mixture. Rock is used to define ground conditions consisting primarily of material that has rock structure in weathered to sound condition. The term “mixed face” usually refers to a situation where the soil conditions vary along the length and/or height of the tunnel.

WSBIS Item 1514 – Complex Tunnel**Pulldown**

NTI Item S.5

Applicable Structure Types

- Tunnels carrying public roadways within

Record whether the tunnel is complex using one of the following codes:

Table 1514 Complex Tunnel Code

WSBIS Code	Description
0	The tunnel is not complex
1	The tunnel is complex

A complex tunnel is characterized by advanced or unique structural elements or functional systems. Complex tunnels may include mechanical or fire suppression equipment to ventilate exhaust from the tunnel or provide protection against tunnel fires. A non-complex tunnel in contrast is typically shorter, not actively ventilated, and may or may not have lighting installed.

WSBIS Item 1401 – Minimum Vertical Clearance Over Tunnel Roadway (feet)**N(5,1)**

NTI Item G.2

Applicable Structure Types

- Tunnels carrying public roadways within

Record the minimum vertical clearance between the mainline tunnel roadway surface and any overhead restriction, i.e. tunnel ceiling, overhead signs, lighting, etc. The roadway surface includes any surface on which a vehicle can travel, including shoulders. Ramps should be excluded when included as part of a tunnel system. The intent is to determine the restrictions of the primary route of the tunnel.

WSBIS Item 1402 – Tunnel Height Restriction

Pulldown

NTI Item L.10

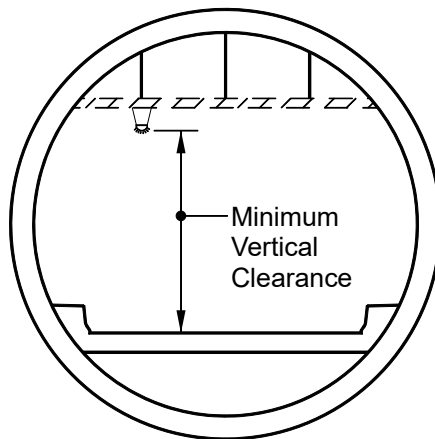
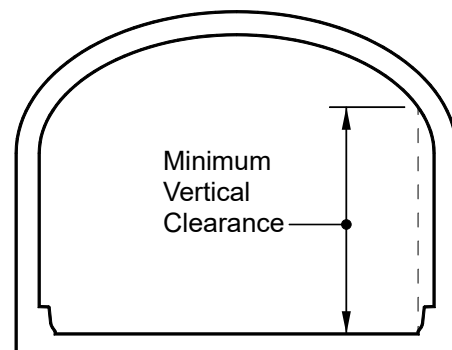
Applicable Structure Types

- Tunnels carrying public roadways within

Record the height restriction status for the route in the tunnel using one of the following codes:

Table 1402 Tunnel Height Restriction Code

WSBIS Code	Description
1	Yes, there is a height restriction
2	No, there is no height restriction

Figure WSBIS 1402a**Figure WSBIS 1402b****WSBIS Item 1408 – Tunnel Hazardous Material Restriction**

Pulldown

NTI Item L.11

Applicable Structure Types

- Tunnels carrying public roadways within

Record the hazardous material restriction status for the route in the tunnel using one of the following codes:

Table 1408 Tunnel Hazardous Material Code

WSBIS Code	Description
1	Yes, there is a hazardous material restriction
2	No, there is no hazardous material restriction

WSBIS Item 1409 – Other Tunnel Restrictions

Pulldown

NTI Item L.12

Applicable Structure Types

- Tunnels carrying public roadways within

Record any other restriction status (not including height or hazardous material restrictions) for the route in the tunnel using one of the following codes:

Table 1409 Other Tunnel Restriction Code

WSBIS Code	Description
1	Yes, there are other restrictions
2	No, there are no other restrictions

Route Tab Supplement

WSBIS Item 1436 – Tunnel Route Direction

Pulldown

NBI Item I.8

Applicable Structure Types

- Tunnels carrying public roadways within

Record the route direction for the route in the tunnel using one of the following codes:

Table 1436 Tunnel Route Direction Code

WSBIS Code	Description
4	West
3	South
2	East
1	North
0	Two route directions

Use code 0 when the tunnel carries both directions of a divided highway, and when the roadway is undivided. Route direction is considered the designated direction of the route, not geographic orientation.

NBI and NTI Items not maintained in the WSBIS

FHWA Item 1 and NTI Item I.3 – State Code

The Washington State Code is 530, and is created automatically for insertion in NBI reports. This data field is not maintained in the Washington State Bridge Inventory.

NBI Item 5E – Route Directional Suffix

Washington State does not maintain directional suffixes to route numbers, so this information is not maintained in the Washington State Bridge Inventory. This code is automatically generated as 0 (not applicable) to the NBI.

FHWA Item 112 – NBIS Bridge Length

The NBIS bridge length = Y for all On records reported to the NBI by definition, and is created automatically for insertion in NBI text file. This data field is not maintained in the Washington State Bridge Inventory.

NTI Items I.15 through I.18– Border Tunnel Data

Washington State has no tunnels across it's borders. These 4 fields are automatically reported as null to the NTI.

NTI Items N.1 through N.3 – Navigable Waterway Data



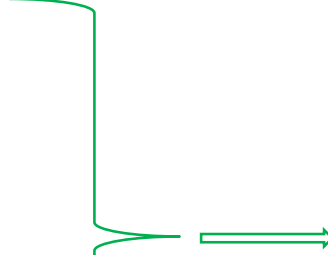


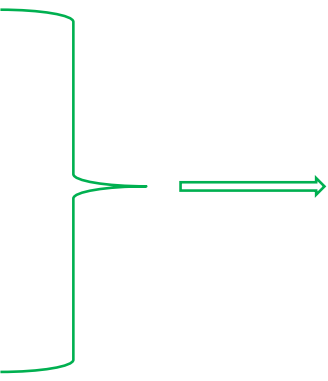



Washington State has no tunnels under navigable waters. These 3 fields are automatically reports as 0 to the NTI.

Appendix 2-D Vacant

Appendix 2-E

WSDOT BMS to NBE Translation
















WSBIS ELEMENTS			Calendar Year 2018	NATIONAL BRIDGE ELEMENTS		
element_id		unit	TRANSLATION	element_id	name	unit
12	Concrete Deck (See Note 9)	SF			intentionally blank	
8217	Concrete Deck (See Note 9)	SF			intentionally blank	
14	Fully Supported Concrete Deck (See Note 9)	SF			intentionally blank	
20	Concrete Deck - Lightweight Aggregate (See Note 9)	SF		12	Reinforced Concrete Deck	SF
26	Concrete Deck w/Coated Bars (See Note 9)	SF			intentionally blank	
35	Concrete Deck Soffit (See Note 9)	SF			intentionally blank	
8216	Concrete Deck Soffit (See Note 9)	SF			intentionally blank	
15	Post Tensioned Concrete Deck	SF		13	Prestressed Concrete Deck	SF
	no state element equivalent			15	Prestressed Concrete Top Flange	SF
13	Bridge Deck Surface	SF		16	Reinforced Concrete Top Flange	SF
8213	Bridge Deck Surface	SF			intentionally blank	
27	Steel Orthotropic Deck	SF			intentionally blank	
30	Deck-Corrugated or Other Steel System	SF		30	Steel Deck—Corrugated/Orthotropic/Etc.	SF
8222	Deck-Corrugated or Other Steel System	SF			intentionally blank	
28	Steel Deck Open Grid	SF		28	Steel Deck—Open Grid	SF
8218	Steel Deck Open Grid	SF			intentionally blank	
29	Steel Deck - Concrete Filled Grid	SF		29	Steel Deck—Concrete Filled Grid	SF
8219	Steel Deck - Concrete Filled Grid	SF			intentionally blank	
31	Timber Deck	SF		31	Timber Deck	SF
8221	Timber Deck	SF			intentionally blank	
32	Fiber Reinforced Polymer (FRP) Deck	SF		60	Other Deck	SF
36	Deck Rebar Cover Flag	SF			intentionally blank	
38	Concrete Slab	SF			intentionally blank	
49	Concrete Hollow Slab	SF			intentionally blank	
50	Prestressed Concrete Slab	SF			intentionally blank	
8150	Prestressed Concrete Slab	SF		38	Reinforced Concrete Slab	SF
51	Prestressed Conc Slab w/Coated Bars	SF			intentionally blank	
8151	Prestressed Conc Slab w/Coated Bars	SF			intentionally blank	



























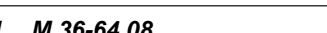
WSBIS ELEMENTS			Calendar Year 2018	NATIONAL BRIDGE ELEMENTS		
element_id		unit	TRANSLATION	element_id	name	unit
52	Concrete Slab w/Coated Bars	SF			intentionally blank	
54	Timber Slab	SF		54	Timber Slab	SF
	no state element equivalent			65	Other Slab	SF
89	Prestressed Concrete Girder w/Coated Strands	LF			intentionally blank	
98	Thin Flange Girder	LF			intentionally blank	
103	Prestressed Concrete Super Girder	LF			intentionally blank	
108	Prestressed Concrete Bulb-T Girder	LF			intentionally blank	
8108	Prestressed Concrete Bulb-T Girder	LF		109	Girder/Beam - Prestressed Concrete	LF
109	Prestressed Concrete Multiple Web Girder Units	LF			intentionally blank	
8109	Prestressed Concrete Multiple Web Girder Units	LF			intentionally blank	
115	Prestressed Concrete Girder	LF			intentionally blank	
8111	Prestressed Concrete Girder	LF			intentionally blank	
97	Prestressed Concrete Tub Girder	LF			intentionally blank	
100	Post-Tensioned Concrete Segmental Box Girder	LF		104	Closed Web/Box Girder - Prestressed Concrete	LF
104	Post-Tensioned Concrete Box Girder	LF			intentionally blank	
90	Steel Rolled Girder	LF			intentionally blank	
8090	Steel Rolled Girder	LF				
91	Steel Riveted Girder	LF			intentionally blank	
92	Steel Welded Girder	LF		107	Girder/Beam - Steel	LF
107	Steel Open Girder	LF			intentionally blank	
8201	Steel Open Girder	LF			intentionally blank	
96	Concrete Encased Steel Girder	LF			intentionally blank	
	no state element equivalent			112	Girder/Beam - Other	LF
102	Steel Box Girder	LF		102	Closed Web/Box Girder - Steel	LF
8200	Steel Box Girder	LF			intentionally blank	
105	Concrete Box Girder	LF		105	Closed Web/Box Girder - Reinforced Concrete	LF

WSBIS ELEMENTS			Calendar Year 2018	NATIONAL BRIDGE ELEMENTS		
element_id		unit	TRANSLATION	element_id	name	unit
	no state element equivalent			106	Closed Web/Box Girder - Other	LF
110	Concrete Girder	LF			intentionally blank	
8110	Concrete Girder	LF		110	Girder/Beam - Reinforced Concrete	LF
114	Concrete Multiple Web Girder Unit	LF			intentionally blank	
111	Timber Glue-Lam Girder	LF			intentionally blank	
117	Timber Sawn Girder	LF		111	Girder/Beam - Timber	LF
8112	Timber Sawn Girder	LF				
8114	Timber Laminated Girder	LF			intentionally blank	
113	Steel Stringer	LF		113	Stringer - Steel	LF
8209	Steel Stringer	LF			intentionally blank	
	no state element equivalent			115	Stringer - Prestressed Concrete	LF
116	Concrete Stringer	LF		116	Stringer - Reinforced Concrete	LF
118	Timber Stringer	LF		117	Stringer - Timber	LF
	no state element equivalent			118	Stringer - Other	LF
119	Concrete Truss	LF		136	Truss - Other	LF
126	Steel Thru Truss	LF			intentionally blank	
8204	Steel Thru Truss	LF		120	Truss - Steel	LF
131	Steel Deck Truss	LF			intentionally blank	
133	Truss Gusset Plates	EA		162	Gusset Plate	EA
8210	Truss Gusset Plates	EA				
135	Timber Truss	LF		135	Truss - Timber	LF
139	Timber Arch	LF		146	Arch - Timber	LF
141	Steel Arch	LF		141	Arch - Steel	LF
142	Steel Tied Arch	LF			intentionally blank	
	no state element equivalent			143	Arch - Prestressed Concrete	LF
	no state element equivalent			145	Arch - Masonry	LF
144	Concrete Arch	LF		144	Arch - Reinforced Concrete	LF
145	Earth Filled Concrete Arch	LF			intentionally blank	








WSBIS ELEMENTS			Calendar Year 2018	NATIONAL BRIDGE ELEMENTS		
element_id		unit	TRANSLATION	element_id	name	unit
	no state element equivalent			142	Arch - Other	LF
143	Steel Suspender - Rolled Shape (see note 7)	EA			intentionally blank	
147	Steel Suspender - Cable (see note 7)	EA		148	Cable - Steel Secondary	EA
146	Suspension - Main Cable (see note 8)	EA		147	Cable - Steel Main	LF
149	Cable Stayed Bridge - Cable (see note 8)	EA			intentionally blank	
150	Concrete Column on Spandrel Arch	EA			intentionally blank	
160	Steel Column on Spandrel Arch	EA			intentionally blank	
152	Steel Floor Beam	LF			intentionally blank	
8206	Steel Floor Beam	LF		152	Floor Beam - Steel	LF
8341	Lift Beam (FC)	LF			intentionally blank	
154	Prestressed Concrete Floorbeam	LF		154	Floor Beam - Prestressed Concrete	LF
155	Concrete Floor Beam	LF		155	Floor Beam - Reinforced Concrete	LF
156	Timber Floor Beam	LF		156	Floor Beam - Timber	LF
	no state element equivalent			157	Floor Beam - Other	LF
161	Steel Hanger (See Note 10)	EA			intentionally blank	
162	Steel Pin	EA		161	Pin, Pin & Hanger Assembly, or both	EA
8343	Apron Two Hinge Pin System/LL Hanger Pins (FC)	EA			intentionally blank	
8342	Live Load Hanger Bars (FC) (See Note 10)	EA			intentionally blank	
163	Tension Hold Down Anchor Assembly				intentionally blank	
200	Abutment Fill	EA			intentionally blank	
202	Steel Pile/Column	EA		202	Column/Pile Extension - Steel	EA
203	Prestressed Concrete Hollow Pile			204	Column/Pile Extension - Prestressed Concrete	EA
204	Prestressed Concrete Pile/Column	EA			intentionally blank	
205	Concrete Pile/Column	EA			intentionally blank	
207	Concrete Pile/Column - w/Steel Jacket	EA		205	Column/Pile Extension - Reinforced Concrete	EA
208	Concrete Pile/Column w/Composite Wrap	EA			intentionally blank	
206	Timber Pile/Column	EA		206	Column/Pile Extension - Timber	EA























WSBIS ELEMENTS			Calendar Year 2018 TRANSLATION	NATIONAL BRIDGE ELEMENTS		
element_id		unit		element_id	name	unit
	no state element equivalent			203	Column - Other	EA
	no state element equivalent			207	Column Tower (Trestle) - Steel	EA
	no state element equivalent			208	Column Tower (Trestle) - Timber	EA
209	Submerged Concrete Pile/Column w/Steel Jacket	EA			intentionally blank	
227	Concrete Submerged Pile/Column	EA		227	Submerged Pile - Reinforced Concrete	EA
8125	Concrete Submerged Pile/Column	EA			intentionally blank	
210	Concrete Pier Wall	LF		210	Pier Wall - Reinforced Concrete	LF
212	Concrete Submerged Pier Wall	LF			intentionally blank	
211	Other Pier Wall	LF		211	Pier Wall - Other	LF
213	Other Submerged Pier Wall	LF			intentionally blank	
214	Concrete Web Wall between Columns	LF			intentionally blank	
	no state element equivalent			212	Pier Wall - Timber	LF
	no state element equivalent			213	Pier Wall - Masonry	LF
215	Concrete Abutment	LF			intentionally blank	
8102	Concrete Abutment	LF		215	Abutment - Reinforced Concrete	LF
219	Concrete Cantilevered Span Abutment	LF			intentionally blank	
216	Timber Abutment	LF		216	Abutment - Timber	LF
8103	Timber Abutment	LF			intentionally blank	
217	Other Abutment	LF		218	Abutment - Other	LF
218	Steel Abutment	LF		219	Abutment - Steel	LF
8101	Steel Abutment				intentionally blank	
	no state element equivalent			217	Abutment - Masonry	LF
220	Concrete Submerged Foundation	EA			intentionally blank	
8136	Concrete Submerged Foundation	EA		220	Pile Cap/Footing - Reinforced Concrete	EA
221	Concrete Foundation	EA			intentionally blank	
222	Timber Foundation	LF			intentionally blank	
225	Steel Submerged Pile/Column	EA			intentionally blank	
8129	Transfer Span/OHL Supercolumn	EA		225	Submerged Pile - Steel	EA









WSBIS ELEMENTS			Calendar Year 2018	NATIONAL BRIDGE ELEMENTS		
element_id		unit	TRANSLATION	element_id	name	unit
8128	Steel Submerged Pile/Column	EA			intentionally blank	
226	Prestressed Concrete Submerged Pile/Column	EA			intentionally blank	
232	Prestressed Concrete Hollow Submerged Pile/Column	EA		226	Submerged Pile - Prestressed Concrete	EA
8127	Prestressed Concrete Submerged Pile/Column	EA			intentionally blank	
228	Timber Submerged Pile/Column	EA		228	Submerged Pile - Timber	EA
8124	Timber Submerged Pile/Column	EA			intentionally blank	
	no state element equivalent			229	Pile - Other	EA
229	Timber Cap Rehab with Steel	LF			intentionally blank	
231	Steel Pier Cap/Crossbeam	LF		231	Pier Cap - Steel	LF
8130	Steel Pier Cap/Crossbeam	LF			intentionally blank	
233	Prestressed Concrete Pier Cap/Crossbeam	LF		233	Pier Cap - Prestressed Concrete	LF
234	Concrete Pier Cap/Crossbeam	LF		234	Pier Cap - Reinforced Concrete	LF
8132	Concrete Pier Cap/Crossbeam	LF			intentionally blank	
235	Timber Pier Cap	LF		235	Pier Cap - Timber	LF
8131	Timber Pier Cap	LF			intentionally blank	
	no state element equivalent			236	Pier Cap - Other	LF
236	Concrete Floating Pontoon	Cell			intentionally blank	
237	Pontoon Hatch/Bulkhead	EA			intentionally blank	
238	Floating Bridge - Anchor Cable	EA		149	Cable - Other Secondary	EA
240	Metal Culvert	LF		240	Culvert - Steel	LF
241	Concrete Culvert	LF		241	Culvert - Reinforced Concrete	LF
242	Timber Culvert	LF		242	Culvert - Timber	LF
	no state element equivalent			244	Culvert - Masonry	LF
243	Other Culvert	LF		243	Culvert - Other	LF
	no state element equivalent			245	Culvert - Prestressed Concrete	LF
260	Steel Open Grid Sidewalk & Supports	SF			intentionally blank	
261	Steel Filled Grid Sidewalk & Supports	SF			intentionally blank	
8261	Steel Filled Grid Sidewalk & Supports	SF			intentionally blank	


WSBIS ELEMENTS			Calendar Year 2018	NATIONAL BRIDGE ELEMENTS		
element_id		unit	TRANSLATION	element_id	name	unit
262	Corrugated/Orthotropic Sidewalk & Supports	SF			intentionally blank	
8262	Corrugated/Orthotropic Sidewalk & Supports	SF			intentionally blank	
264	Timber Sidewalk & Supports	SF			intentionally blank	
8264	Timber Sidewalk & Supports	SF			intentionally blank	
266	Concrete Sidewalk & Supports	SF			intentionally blank	
8266	Concrete Sidewalk & Supports	SF			intentionally blank	
267	Fiber Reinforced Polymer(FRP) Sidewalk & Supports	SF			intentionally blank	
8265	Fiber Reinforced Polymer(FRP) Sidewalk & Supports	SF			intentionally blank	
310	Elastomeric Bearing	EA		310	Elastomeric Bearing	EA
311	Moveable Bearing (roller, sliding, etc)	EA		311	Moveable Bearing (roller, sliding, etc)	EA
8391	Moveable Bearing (roller, sliding, etc)	EA			intentionally blank	
312	Concealed Bearing or Bearing System	EA		312	Enclosed/Concealed Bearing	EA
313	Fixed Bearing	EA		313	Fixed Bearing	EA
8390	Fixed Bearing	EA			intentionally blank	
316	Isolation Bearing	EA		316	Bearing - Other	EA
314	Pot Bearing	EA		314	Pot Bearing	EA
315	Disc Bearing	EA		315	Disk Bearing	EA
321	Concrete Roadway Approach Slab	SF			intentionally blank	
322	Bridge Impact	EA			intentionally blank	
330	Metal Bridge Railing	LF		330	Metal Bridge Railing	LF
8810	Metal Bridge Railing	LF			intentionally blank	
331	Concrete Bridge Railing	LF		331	Reinforced Concrete Bridge Railing	LF
8811	Concrete Bridge Railing	LF			intentionally blank	
332	Timber Bridge Railing	LF		332	Timber Bridge Railing	LF
8812	Timber Bridge Railing	LF			intentionally blank	
333	Other Bridge Railing	LF		333	Other Bridge Railing	LF
8813	Other Bridge Railing	LF			intentionally blank	

WSBIS ELEMENTS			Calendar Year 2018	NATIONAL BRIDGE ELEMENTS		
element_id		unit		element_id	name	unit
	no state element equivalent		TRANSLATION	334	Masonry Bridge Railing	LF
340	Metal Pedestrian Railing	LF			intentionally blank	
8815	Metal Pedestrian Railing	LF			intentionally blank	
341	Concrete Pedestrian Railing	LF			intentionally blank	
8816	Concrete Pedestrian Railing	LF			intentionally blank	
342	Timber Pedestrian Railing	LF			intentionally blank	
8817	Timber Pedestrian Railing	LF			intentionally blank	
343	Other Pedestrian Railing	LF			intentionally blank	
8818	Other Pedestrian Railing	LF			intentionally blank	
355	Damaged Bolts or Rivets	EA			intentionally blank	
8355	Damaged Bolts or Rivets	EA			intentionally blank	
356	Steel Cracking	EA			intentionally blank	
8356	Steel Cracking	EA			intentionally blank	
357	Pack Rust	EA			intentionally blank	
8357	Pack Rust	EA			intentionally blank	
360	Bridge Movement	EA			intentionally blank	
8360	Bridge Movement	EA			intentionally blank	
361	Scour	EA			intentionally blank	
8361	Scour	EA			intentionally blank	
8362	Impact Damage	EA			intentionally blank	
378	Undercrossing Primary Safety New in 2018	EA			intentionally blank	
379	Undercrossing Secondary Safety New in 2018	EA			intentionally blank	
367	Movable Bridge	EA			intentionally blank	
368	Seismic Pier Crossbeam Bolster	EA			intentionally blank	
369	Seismic Pier Infill Wall	EA			intentionally blank	
370	Seismic - Longitudinal Restrainer	EA			intentionally blank	
8370	Seismic - Longitudinal Restrainer	EA			intentionally blank	
371	Seismic - Transverse Restrainer	EA			intentionally blank	

WSBIS ELEMENTS			Calendar Year 2018	NATIONAL BRIDGE ELEMENTS		
element_id		unit		element_id	name	unit
8371	Seismic - Transverse Restrainer	EA			intentionally blank	
372	Seismic - Link/Pin Restrainer	EA			intentionally blank	
373	Seismic - Catcher Block	EA			intentionally blank	
374	Seismic - Column Silo	EA			intentionally blank	
375	Cathodic Protection	EA			intentionally blank	
8375	Cathodic Protection	EA			intentionally blank	
376	Concrete Deck Delamination Testing	SF			intentionally blank	
8376	Concrete Deck Delamination Testing	SF			intentionally blank	
400	Asphalt Butt Joint Seal (see note 11)	LF			intentionally blank	
403	Concrete Bulb-T (see note 11)	LF		301	Pourable Joint	LF
417	Silicone Rubber Joint Filler (see note 11)	LF			intentionally blank	
401	Asphalt Open Joint Seal (see note 11)	LF			intentionally blank	
402	Open Concrete Joint (see note 11)	LF			intentionally blank	
407	Steel Angle Header (see note 11)	LF		304	Open Joint	LF
8407	Steel Angle Header (see note 11)	LF			intentionally blank	
419	Steel Angle w/Raised Bars (see note 11)	LF			intentionally blank	
408	Steel Sliding Plate (see note 11)	LF			intentionally blank	
8408	Steel Sliding Plate (see note 11)	LF			intentionally blank	
409	Steel Sliding Plate w/Raised Bars (see note 11)	LF		305	Assembly Joint without Seal	LF
414	Bolt Down - Sliding Plate w/Springs (see note 11)	LF			intentionally blank	
410	Steel Fingers (see note 11)	LF			intentionally blank	
411	Steel Fingers w/Raised Bars (see note 11)	LF			intentionally blank	
404	Compression Seal / Concrete Header (see note 11)	LF			intentionally blank	
8404	Compression Seal / Concrete Header (see note 11)	LF			intentionally blank	
405	Compression Seal / Polymer Header (see note 11)	LF		302	Compression Seal	LF
406	Compression Seal / Steel Header (see note 11)	LF			intentionally blank	
8406	Compression Seal / Steel Header (see note 11)	LF			intentionally blank	
412	Strip Seal - Anchored (see note 11)	LF		300	Strip Seal	LF





WSBIS ELEMENTS			Calendar Year 2018	NATIONAL BRIDGE ELEMENTS		
element_id		unit	TRANSLATION	element_id	name	unit
413	Strip Seal - Welded (see note 11)	LF			intentionally blank	
416	Assembly Joint Seal (Modular) (see note 11)	LF		303	Assembly Joint Seal (Modular)	LF
415	Bolt Down Panel - Molded Rubber (see note 11)	LF			intentionally blank	
418	Asphalt Plug (see note 11)	LF		306	Joint - Other	LF
422	Flexible Joint Seal	LF			intentionally blank	
420	Joint Paved Over Flag	LF			intentionally blank	
421	Joint Over Steel Corbel Bearings	LF			intentionally blank	
501	Movable Bridge Steel Tower	LF			intentionally blank	
705	Bridge Luminaire Pole and Base	EA			intentionally blank	
8705	Bridge Luminaire Pole and Base	EA			intentionally blank	
707	Fender System/Pier Protection	EA			intentionally blank	
709	Ceramic Tile	SF			intentionally blank	
710	Bridge Mounted Sign Structure	EA			intentionally blank	
800	Asphaltic Concrete (AC) Overlay (see note 11)	SF			intentionally blank	
8223	Asphaltic Concrete (AC) Overlay (see note 11)	SF			intentionally blank	
801	AC Overlay with Waterproofing Membrane (see note 11)	SF			intentionally blank	
802	Thin Polymer Overlay (see note 11)	SF			intentionally blank	
8224	Thin Polymer Overlay (see note 11)	SF		510	Wearing Surfaces	SF
803	Modified Concrete Overlay (see note 11)	SF			intentionally blank	
804	Polyester Concrete Overlay (see note 11)	SF			intentionally blank	
805	AC Over a Polymer Overlay (see note 11)	SF			intentionally blank	
807	AC Overlay with High Performance Membrane	SF				

WSBIS ELEMENTS			Calendar Year 2018	NATIONAL BRIDGE ELEMENTS			
element_id		unit	TRANSLATION	element_id	name	unit	
806	BST on Concrete (Chip Seal)	SF	          		intentionally blank		
901	Red Lead Alkyd Paint System	SF				intentionally blank	
8901	Red Lead Alkyd Paint System	SF				intentionally blank	
902	Inorganic-Zinc/Vinyl Paint System	SF				intentionally blank	
8902	Inorganic-Zinc/Vinyl Paint System	SF				intentionally blank	
903	Inorganic Zinc/Urethane Paint System	SF				intentionally blank	
8903	Inorganic Zinc/Urethane Paint System	SF				intentionally blank	
904	Organic Zinc/Urethane Paint System	SF				intentionally blank	
8904	Organic Zinc/Urethane Paint System	SF				intentionally blank	
905	Coal Tar Epoxy Paint System	SF			515	Steel Protective Coating	SF
8905	Coal Tar Epoxy Paint System	SF				intentionally blank	
906	Metallizing	SF				intentionally blank	
907	Galvanizing	SF				intentionally blank	
8907	Galvanizing	SF				intentionally blank	
908	Epoxy Paint for Weathering Steel	SF				intentionally blank	
909	Zinc Primer	SF				intentionally blank	
8909	Zinc Primer	SF				intentionally blank	
910	Weathering Steel Patina	SF				intentionally blank	
	no state element equivalent			521	Concrete Protective Coating	SF	
8225	Non-skid Metal Surfacing	SF			intentionally blank		
8263	Steel Open Grid Sidewalk w/Cover Plate & Suppt.	SF			intentionally blank		
8301	Apron Steel Orthotropic Deck	SF			intentionally blank		
8305	Apron Hinge Multi-Pin & Plate	EA			intentionally blank		
8307	Apron Lips & Pins	EA			intentionally blank		
8310	Apron Hoist/Cables/Spool/Platform/Supports/Rigging	EA			intentionally blank		
8312	Span Apron/Cab Gangplank Pivot/Raise/Rams/Fittings	EA			intentionally blank		
8348	Span Hoist/Cables/Spool/Platform/Supports/Rigging	EA			intentionally blank		
8413	Steel Tower	EA			intentionally blank		










































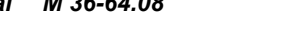

WSBIS ELEMENTS			Calendar Year 2018	NATIONAL BRIDGE ELEMENTS		
element_id		unit		element_id	name	unit
8414	Timber Tower	EA			intentionally blank	
8415	Steel Headframe	LF			intentionally blank	
8416	Timber Headframe	LF			intentionally blank	
8417	Tower Base Platform	SF			intentionally blank	
8418	Counterweight Guides	EA			intentionally blank	
8419	Concrete Counterweights	EA			intentionally blank	
8420	CTWT Sheaves/Shafts(FC)/Bearings/Anchor Blts.	EA			intentionally blank	
8421	Counterweight Cable Protective Systems	LF			intentionally blank	
8423	Steel Counterweights	EA			intentionally blank	
8450	Timber Wingwalls	LF			intentionally blank	
8451	Steel Pile Frame Wingwalls	LF			intentionally blank	
8460	Timber Pile Dolphins	EA			intentionally blank	
8462	Steel Pile Frame Dolphins	EA			intentionally blank	
8463	Timber Floating Dolphin	LF			intentionally blank	
8464	Concrete Pontoon Floating Dolphin	LF			intentionally blank	
8640	Moveable Pedestrian Gangplank	LF			intentionally blank	
8650	Overhead Passenger Loading Cab	SF			intentionally blank	
8653	Passenger Cab Floor System and Lift Beam(FC)	LF			intentionally blank	
8701	Ferry Concrete Floating Pontoon	CELL			intentionally blank	
8702	Ferry Steel Floating Pontoon	CELL			intentionally blank	
8703	Spud Piling & Wells	EA			intentionally blank	
8704	Pontoon Anchors, Anchor Chain/Cables/Clamps	EA			intentionally blank	
8906	Epoxy Paint System	SF			intentionally blank	
8910	Safety Access Ladders	EA			intentionally blank	
8911	Safety Railing & Catwalks	LF			intentionally blank	












WSBIS ELEMENTS			Calendar Year 2018 TRANSLATION	NATIONAL BRIDGE ELEMENTS		
element_id		unit		element_id	name	unit

Translation Notes

1.	State elements highlighted in light blue are used for structures owned and maintained by the Washington State Ferry system.					
2.	National bridge elements that do not have a state element equivalent are highlighted in orange.					
3.	A green arrow:  indicates that the state element should be directly translated to the national element, including total quantities and each quantity for each condition state.					
4.	A green bracket with a green arrow:  indicates that all state elements on a given bridge need total quantity and the quantity in each condition state to be summed prior to translation to the indicated national element.					
5.	A green drop arrow:  indicates the state element is not translated to a national element.					
6.	A red arrow:  indicates special treatment is required for the translation. See associated note for details.					
7.	Element 143 and 147 have been re-named to more clearly describe the existing intent of these elements. WSDOT owned bridges have 12 bridges with element 143 (for example 5/140E&W) and 3 bridges with element 147 (for example TNB 16/110E).					
8.	State Elements 146 and 149 will remain EA units. Quantities in each condition state and the total will be summed and reported in NBI element 147 as LF units without alteration.					
9.	Deck Translation Specifications - see separate worksheet					
10.	Pin and Pin & Hanger Translation Specifications - see separate worksheet.					
11.	Joint and Wearing Surface Specifications - see separate worksheet.					

			BMS Elements	NATIONAL TUNNEL ELEMENTS		
element_id	Name	unit		element_id	Name	unit
10000	Steel Tunnel Liner	SF	→	10000	Steel Tunnel Liner	SF
10001	Cast-in-Place Concrete Tunnel Liner	SF	→	10001	Cast-in-Place Concrete Tunnel Liner	SF
10002	Precast Concrete Tunnel Liner	SF	→	10002	Precast Concrete Tunnel Liner	SF
10003	Shotcrete Tunnel Liner	SF	→	10003	Shotcrete Tunnel Liner	SF
10004	Timber Tunnel Liner	SF	→	10004	Timber Tunnel Liner	SF
10005	Masonry Tunnel Liner	SF	→	10005	Masonry Tunnel Liner	SF
10006	Unlined Rock Tunnel	SF	→	10006	Unlined Rock Tunnel	SF
10007	Rock Bolt/Dowel	EA	→	10007	Rock Bolt/Dowel	EA
10009	Other Tunnel Liner	SF	→	10009	Other Tunnel Liner	SF
10010	Steel Tunnel Roof Girders	LF	→	10010	Steel Tunnel Roof Girders	LF
10011	Concrete Tunnel Roof Girders	LF	→	10011	Concrete Tunnel Roof Girders	LF
10012	Prestressed Concrete Tunnel Roof Girders	LF	→	10012	Prestressed Concrete Tunnel Roof Girders	LF
10019	Other Tunnel Roof Girders	LF	→	10019	Other Tunnel Roof Girders	LF
10020	Steel Columns/Piles	EA	→	10020	Steel Columns/Piles	EA
10021	Concrete Columns/Piles	EA	→	10021	Concrete Columns/Piles	EA
10029	Other Columns/Piles	EA	→	10029	Other Columns/Piles	EA
10030	Steel Cross Passageway	LF	→	10030	Steel Cross Passageway	LF
10031	Concrete Cross Passageway	LF	→	10031	Concrete Cross Passageway	LF
10033	Shotcrete Cross Passageway	LF	→	10033	Shotcrete Cross Passageway	LF
10034	Timber Cross Passageway	LF	→	10034	Timber Cross Passageway	LF
10035	Masonry Cross Passageway	LF	→	10035	Masonry Cross Passageway	LF
10036	Unlined Rock Cross Passageway	LF	→	10036	Unlined Rock Cross Passageway	LF
10039	Other Cross Passageway	LF	→	10039	Other Cross Passageway	LF
10041	Concrete Interior Walls	SF	→	10041	Concrete Interior Walls	SF
10049	Other Interior Walls	SF	→	10049	Other Interior Walls	SF
10051	Concrete Portal	SF	→	10051	Concrete Portal	SF
10055	Masonry Portal	SF	→	10055	Masonry Portal	SF
10059	Other Portal	SF	→	10059	Other Portal	SF
10061	Concrete Ceiling Slab	SF	→	10061	Concrete Ceiling Slab	SF
10069	Other Ceiling Slab	SF	→	10069	Other Ceiling Slab	SF
10070	Steel Ceiling Girder	LF	→	10070	Steel Ceiling Girder	LF
10071	Concrete Ceiling Girder	LF	→	10071	Concrete Ceiling Girder	LF
10072	Prestressed Concrete Ceiling Girder	LF	→	10072	Prestressed Concrete Ceiling Girder	LF
10079	Other Ceiling Girder	LF	→	10079	Other Ceiling Girder	LF
10080	Steel Hangers and Anchorages	EA	→	10080	Steel Hangers and Anchorages	EA

10089	Other Hangers and Anchorages	EA		10089	Other Hangers and Anchorages	EA
10090	Steel Ceiling Panels	SF		10090	Steel Ceiling Panels	SF
10091	Concrete Ceiling Panels	SF		10091	Concrete Ceiling Panels	SF
10099	Other Ceiling Panels	SF		10099	Other Ceiling Panels	SF
10101	Concrete Invert Slab	SF		10101	Concrete Invert Slab	SF
10109	Other Invert Slab	SF		10109	Other Invert Slab	SF
10111	Concrete Slab-on-Grade	SF		10111	Concrete Slab-on-Grade	SF
10119	Other Slab-on-Grade	SF		10119	Other Slab-on-Grade	SF
10120	Steel Invert Girder	LF		10120	Steel Invert Girder	LF
10121	Concrete Invert Girder	LF		10121	Concrete Invert Girder	LF
10122	Prestressed Concrete Invert Girder	LF		10122	Prestressed Concrete Invert Girder	LF
10129	Other Invert Girder	LF		10129	Other Invert Girder	LF
10130	Strip Seal Expansion Joint	LF		10130	Strip Seal Expansion Joint	LF
10131	Pourable Joint Seal	LF		10131	Pourable Joint Seal	LF
10132	Compression Joint Seal	LF		10132	Compression Joint Seal	LF
10133	Assembly Joint With Seal	LF		10133	Assembly Joint With Seal	LF
10134	Open Expansion Joint	LF		10134	Open Expansion Joint	LF
10135	Assembly Joint Without Seal	LF		10135	Assembly Joint Without Seal	LF
10139	Other Joint	LF		10139	Other Joint	LF
10140	Gaskets	LF		10140	Gaskets	LF
10151	Concrete Wearing Surface	SF		10151	Concrete Wearing Surface	SF
10158	Asphalt Wearing Surface	SF		10158	Asphalt Wearing Surface	SF
10159	Other Wearing Surface	SF		10159	Other Wearing Surface	SF
10160	Steel Traffic Barrier	LF		10160	Steel Traffic Barrier	LF
10161	Concrete Traffic Barrier	LF		10161	Concrete Traffic Barrier	LF
10169	Other Traffic Barrier	LF		10169	Other Traffic Barrier	LF
10170	Steel Pedestrian Railing	LF		10170	Steel Pedestrian Railing	LF
10171	Concrete Pedestrian Railing	LF		10171	Concrete Pedestrian Railing	LF
10179	Other Pedestrian Railing	LF		10179	Other Pedestrian Railing	LF
10200	Ventilation System	EA		10200	Ventilation System	EA
10201	Fans	EA		10201	Fans	EA
10300	Drainage and Pumping System	EA		10300	Drainage and Pumping System	EA
10301	Pumps	EA		10301	Pumps	EA
10400	Emergency Generator System	EA		10400	Emergency Generator System	EA
10475	Flood Gate	EA		10475	Flood Gate	EA
10500	Electrical Distribution System	EA		10500	Electrical Distribution System	EA
10550	Emergency Distribution System	EA		10550	Emergency Distribution System	EA
10600	Tunnel Lighting Systems	EA		10600	Tunnel Lighting Systems	EA
10601	Tunnel Lighting Fixtures	EA		10601	Tunnel Lighting Fixtures	EA
10620	Emergency Lighting Systems	EA		10620	Emergency Lighting Systems	EA
10621	Emergency Lighting Fixtures	EA		10621	Emergency Lighting Fixtures	EA
10650	Fire Detection System	EA		10650	Fire Detection System	EA
10700	Fire Protection System	EA		10700	Fire Protection System	EA

10750	Emergency Communications System	EA		10750	Emergency Communications System	EA
10800	Tunnel Operations and Security System	EA		10800	Tunnel Operations and Security System	EA
10850	Traffic Sign	EA		10850	Traffic Sign	EA
10870	Egress Sign	EA		10870	Egress Sign	EA
10890	Variable Message Board	EA		10890	Variable Message Board	EA
10910	Lane Signal	EA		10910	Lane Signal	EA
10911	Lane Signal Fixture	EA		10911	Lane Signal Fixture	EA
10950	Steel Corrosion Protective Coating	SF		10950	Steel Corrosion Protective Coating	SF
10951	Concrete Corrosion Protective Coating	SF		10951	Concrete Corrosion Protective Coating	SF
10952	Fire Protective Coating	SF		10952	Fire Protective Coating	SF
10955	Reflective Tunnel Tile	SF			intentionally blank	

Note 9 - Deck Translation Specifications

For WSDOT elements 12, 14, 20, 26, and 8217, perform the following steps towards translation to NBE element 12:

Step	Description
1	Sum total quantities and all quantities in each condition state into an NBE Temp element 12.
2	Move all quantities in WSDOT CS4 into NBE Temp CS2, adding to the quantity of NBE Temp CS2 added in Step 1. NBE Temp CS4 will have zero quantity at this point.
3	Move all quantities in WSDOT CS3 into NBE Temp CS4.
4	Add WSDOT elements 35 and 8216 CS2 to NBE Temp CS2.
5	Add WSDOT elements 35 and 8216 CS3 to NBE Temp CS4.
6	If NBE Temp total quantity = NBE Temp CS1 + CS2 + CS3 + CS4, go to Step 11.
7	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS1 to zero limit, then go to Step 6.
8	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS2 to zero limit, then go to Step 6.
9	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS3 to zero limit, then go to Step 6.
10	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, set NBE Temp CS4 = NBE Temp total quantity, then go to Step 11.
11	Move NBE Temp total quantity and all Temp CS1 through CS4 quantities to final NBE element
12	Note that CS3 will have zero quantity in the final translation.

For WSDOT elements 13 and 8413, perform the following steps towards translation to NBE element 16:

Step	Description
1	Sum total quantities and all quantities in each condition state into NBE element 16.
2	Move all quantities in WSDOT CS4 into NBE CS2, adding to the quantity of NBE CS2 added in Step 1. NBE CS4 will have zero quantity at this point.
3	Move all quantities in WSDOT CS3 into NBE CS4. Note that NBE CS3 will have zero quantity in the final translation.

Note 10 - Pin, Pin & Hanger Translation Specifications

For WSDOT elements 162 and 8343, perform the following steps towards translation to NBE element 161:

Step	Description
1	Sum the WSDOT elements 162 and 8243 total quantities and all condition state quantities into NBE Temp element 161.
2	Add the WSDOT element 161 and 8342 CS1 through CS4 to corresponding NBE Temp element 161 CS1 through CS4.
3	If NBE Temp total quantity = NBE Temp CS1 + CS2 + CS3 + CS4, go to Step 8.
4	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS1 to zero limit, then go to Step 3.
5	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS2 to zero limit, then go to Step 3.
6	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, deduct difference from NBE Temp CS3 to zero limit, then go to Step 3.
7	If NBE Temp total quantity > NBE Temp CS1 + CS2 + CS3 + CS4, set NBE Temp CS4 = NBE Temp total quantity, then go to Step 8.
8	Move NBE Temp total quantity and all Temp CS1 through CS4 quantities to final NBE element 161.

Note 11 - Joint and Wearing Surface Translation Specifications

For WSDOT elements 400, 403 and 417, perform the following steps towards translation to NBE element 301:

Step	Description
1	Sum the WSDOT element total quantities and into NBE element total quantities.
2	Sum the WSDOT element CS1 quantities into NBE element CS2 quantities. Note that NBE will have zero quantities in CS1.
3	Sum the WSDOT element CS2 quantities into NBE element CS3 quantities.
4	Sum the WSDOT element CS3 quantities into NBE element CS4 quantities.

Perform these same steps listed above for the following translations:

- WSDOT elements 401, 402, 407 8407, and 419 translated into NBE element 304
- WSDOT elements 408, 8408, 409, 414, 410 and 411 translated into NBE element 305
- WSDOT elements 404, 8404, 405, 406 and 8406 translated into NBE element 302
- WSDOT elements 412 and 413 translated into NBE element 300
- WSDOT element 416 translated into NBE element 303
- WSDOT elements 415 and 418 translated into NBE element 306
- WSDOT elements 800, 8223, 801, 802, 8224, 803, 804, and 805 translated into NBE element 510

Note 12 - Paint/Coating Translation Specifications

For WSDOT elements 901, 8901, 902, 8902, 903, 8903, 904, 8904, 905, 8905, 906, 907, 8907, 908, 909, 8909, and 910, perform the following steps towards translation to NBE element 515:

Step	Description
1	Sum the WSDOT element total quantities and into NBE element total quantities.
2	Sum the WSDOT element CS1 quantities into NBE element CS1 quantities.
3	Sum the WSDOT element CS2 quantities into NBE element CS2 quantities.
4	Sum the WSDOT element CS3 quantities into NBE element CS4 quantities. Note that NBE CS3 will always have zero quantities.

Appendix 2-F Border Bridge Information

Oregon

Send all reports and any requests for their reports to

Erick Cain, OPMA, Erick.j.cain@odot.state.or.us
Bridge Inventory Coordinator
4040 Fairview Industrial Dr. SE MS #4
Salem, OR 97302
Phone: 503 986 3384 Fax: 503 986 3407

Region 1 - (Longview to Hood River) -

Joel Boothe, Joel.E.BOOTHE@odot.state.or.us
Office 503-652-5691, Cell 503-969-1091, Fax 503-653-3085

Inspected by Oregon:

5/1E - 000000PR - Columbia R Interstate (Oregon #01377A)
5/1W - 0005216A - Columbia R Interstate (Oregon #07333)
205/1 - 0010833A - Glen Jackson Bridge (Oregon #09555)
0259228300 - 08712700 - Br of the Gods (Oregon # 02592)

Inspected by Washington:

433/1 - 0003760A - Lewis & Clark (Oregon #02046)

Region 2 -

Bill Burns, 503-986-2659, Robert.W.BURNS@odot.state.or.us

Inspected by Oregon:

101/1 - 0007666A - Megler (Oregon #07949D) - Spans 1-4
101/1(A) - 0007666B - Megler(A) (Oregon #07949A) - Spans 5-19
101/1(B) - 0007666C - Megler(B) (Oregon #07949B) - Spans 20-159
101/1(C) - 0007666D - Megler(C) (Oregon #07949C) - Span 160

Region 4 - (Hood River to Biggs Jct.) -

Mike Pulzone, James.M.PULZONE@odot.state.or.us
Office 541-388-6188, Cell 541-419-1688, Fax 541-388-6108

Inspected by Oregon:

197/1 - 000000PC - The Dalles (Oregon #06635Q)

Inspected by Washington:

97/1 - 0006539A - Biggs Rapids-Sam Hill (Oregon #00849A)

Inspected by Consultants

06645 - 000000PH - Hood River (Oregon #06645)

Region 5 -

Kelley McAlister, Kelley.T.MCALISTER@odot.state.or.us
541-963-1371

Inspected by Washington:

82/280N - 0012819A - Umatilla (Oregon #16424)
82/280S - 000000PD - Umatilla (Oregon #02230A)

Oregon Underwater Reports -

Rick Shorb, Rick.L.SHORB@odot.state.or.us

Idaho

Patty Fish, patty.fish@itd.idaho.gov, 208-334-8847
cc to Kathleen Slinger, Kathleen.Slinger@itd.idaho.gov

Inspected by Washington

12/915 – 0002348A – Snake R Clarkston (ID SID 000000000010360)

Inspected by Idaho

41/10 – 00000LLV – BNRR OC (ID SID 000000000014255)

90/594N – 00200520 – Spokane River (ID SID 000000000016735)

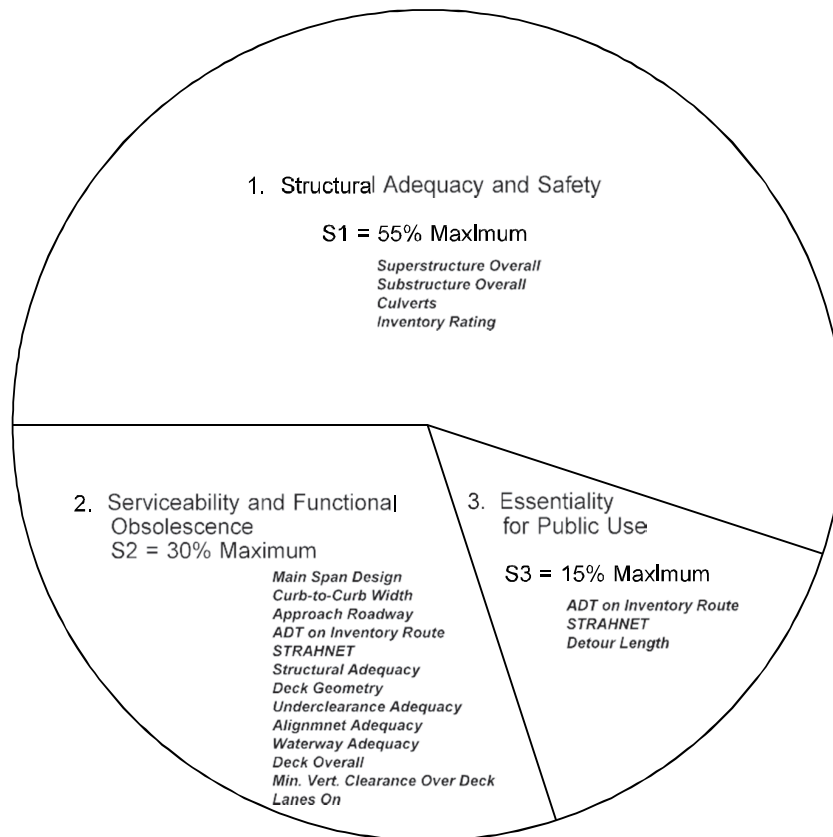
90/594S – 00200519 – Spokane River (ID SID 000000000016740)

5700-1 – 08374400 – Southway Bridge (ID SID 000000000021495) – Local Agency
owned (Asotin County) – Idaho works directly with Asotin County

Appendix 2-G Sufficiency Rating Calculation

Sufficiency Rating Worksheet

An Illustration of Sufficiency Rating (SR) Factors



4. Special Reductions S4 = 13% Maximum

Detour Length
Main Span Design
Bridge Rail
Transition
Guardrail
Terminal

$$\text{Sufficiency Rating} = S1 + S2 + S3 - S4$$

Sufficiency Rating shall not be < 0 nor > 100

If $S1 + S2 + S3 \geq 50$, then subtract S4,
otherwise SR = $S1 + S2 + S3$

Structure ID: _____

Bridge Number: _____

Bridge Name: _____

Sufficiency Rating = S1 + S2 + S3 - S4 (Range: 0 to 100)

= () + () + () - ()

= _____

SD/FO (WSBIS Item 2711) = _____

Calculated by: _____

Date: _____

Note:

These calculations use English units. The final value may differ slightly from WSBIS Item 2710 as it is calculated using metric values.

STRUCTURAL ADEQUACY & SAFETY (S1)**1. Determine the value of A:**

(a) Enter the condition codes for:

WSBIS 1671	SUPERSTRUCTURE OVERALL	_____
WSBIS 1676	SUBSTRUCTURE CONDITION	_____
WSBIS 1678	CULVERT CONDITION	_____

(b) Find A:

A = 55 : If the lowest code above is less than or equal to 2

A = 40 : If the lowest code is equal to 3

A = 25 : If the lowest code is equal to 4

A = 10 : If the lowest code is equal to 5

A = 0 : If the lowest code is greater than 5

A = _____

2. Determine the value of B:***Either:***

when the Inventory Rating uses Tons:

(a) Enter the Inventory Rating (IR):

WSBIS 1555 INVENTORY RATING (IR)=_____TONS

(b) Find the value of B:

$$B = (36 - IR)^{1.5} \times 0.2778$$

B = _____

Or:

when the Inventory Rating uses a Factor*:

(a) Enter the Inventory Rating (IR):

WSBIS 1556 INVENTORY RATING (IR)=_____FACTOR

(b) Find the value of B:

$$B = (36 - (IR \times 36))^{1.5} \times 0.2778$$

B = _____

3. Determine S1:

$$S1 = 55 - (A + B)$$

S1 = _____ (points range from 0 to 55)

* See article at <http://www.fhwa.dot.gov/bridge/bridgeload01.cfm>

SERVICEABILITY & FUNCTIONAL OBSOLESCENCE (S2)**1. Determine the value of C:**

- (a) Enter the adequacy or condition codes for the fields listed.
 (b) Determine corresponding values for these codes from Table 1.
 (c) For codes higher than those listed, use a value of 0.

TABLE 1

	Code	Value
If <i>STRUCTURAL EVALUATION</i> is:	≤ 3	= 4
<i>WSBIS 1657</i>	= 4	= 2
	= 5	= 1
If <i>DECK GEOMETRY</i> is:	≤ 3	= 4
<i>WSBIS 1658</i>	= 4	= 2
	= 5	= 1
If <i>UNDERCLEARANCES</i> is:	≤ 3	= 4
<i>WSBIS 1659</i>	= 4	= 2
	= 5	= 1
If <i>ALIGNMENT</i> is:	≤ 3	= 4
<i>WSBIS 1661</i>	= 4	= 2
	= 5	= 1
If <i>WATERWAY</i> is:	≤ 3	= 4
<i>WSBIS 1662</i>	= 4	= 2
	= 5	= 1
If <i>OVERALL DECK CONDITION</i> is:	≤ 3	= 5
<i>WSBIS 1663</i>	= 4	= 3
	= 5	= 1

- (d) Add the values to determine C.

	<u>Code</u>	<u>Value</u>
<i>WSBIS 1657 STRUCTURAL EVALUATION</i>	_____	_____
<i>WSBIS 1658 DECK GEOMETRY</i>	_____	_____
<i>WSBIS 1659 UNDERCLEARANCES</i>	_____	_____
<i>WSBIS 1661 ALIGNMENT</i>	_____	_____
<i>WSBIS 1662 WATERWAY</i>	_____	_____
<i>WSBIS 1663 OVERALL DECK CONDITON</i>	_____	_____
	TOTAL C =	_____ (13 maximum)

2. Determine the value of D:

(a) Enter measurements for the following fields:

WSBIS 1397 *APPROACH ROADWAY WIDTH* _____
 WSBIS 1356 *CURB-TO-CURB WIDTH* _____

(b) Find the value of D: (For bridges that are not culverts (i.e., Main Span Design is not 19))

APPROACH ROADWAY WIDTH > (*CURB-TO-CURB WIDTH* + 2.0'), D = 5
APPROACH ROADWAY WIDTH ≤ (*CURB-TO-CURB WIDTH* + 2.0'), D = 0

D = _____

3. Determine the value of E:

(a) Enter or determine the following values:

WSBIS 1352 *LANES ON* _____
 WSBIS 1356 *CURB-TO-CURB WIDTH* _____
 WSBIS 1445 *ADT ON INVENTORY ROUTE* _____
 Lane Width (rounded to tenths):
 CURB-TO-CURB WIDTH/LANES ON _____
 ADT/Lane:
 ADT ON INVENTORY ROUTE/LANES ON _____

(b) Find the value of E: (where the following conditions apply)

For One-Lane Bridges:

- Lane Width < 14, E = 15
- $14 \leq \text{Lane Width} < 18$, E = 15 ((18-Lane Width)/4) = _____
- Lane Width ≥ 18, E = 0

For Two or More Lane Bridges:

- *LANES ON* = 02 and Lane Width ≥ 16, E = 0
- *LANES ON* = 03 and Lane Width ≥ 15, E = 0
- *LANES ON* = 04 and Lane Width ≥ 14, E = 0
- *LANES ON* > 05 and Lane Width ≥ 12, E = 0

If the above calculations apply, do not continue.

- ADT/Lane > 50 and Lane Width < 9, E = 15
- ADT/Lane ≤ 50 and Lane Width < 9, E = 7.5
- ADT/Lane ≤ 50 and Lane Width ≥ 9, E = 0

- $50 < \text{ADT/Lane} \leq 125$ and Lane Width < 10, E = 15
- $50 < \text{ADT/Lane} \leq 125$ and $10 \leq \text{Lane Width} < 13$,
 E = 15 (13 - Lane Width)/3 = _____
- $50 < \text{ADT/Lane} \leq 125$ and Lane Width ≥ 13, E = 0

- $125 < \text{ADT/Lane} \leq 375$ and Lane Width < 11, E = 15
- $125 < \text{ADT/Lane} \leq 375$ and $11 \leq \text{Lane Width} < 14$,
 E = 15 (14 - Lane Width)/3 = _____
- $125 < \text{ADT/Lane} \leq 375$ and Lane Width ≥ 14, E = 0

- $375 < \text{ADT/Lane} \leq 1350$ and Lane Width < 12 , $E = 15$
- $375 < \text{ADT/Lane} \leq 1350$ and $12 \leq \text{Lane Width} < 16$,
 $E = 15 (16 - \text{Lane Width})/4 = \underline{\hspace{2cm}}$
- $375 < \text{ADT/Lane} \leq 1350$ and Lane Width ≥ 16 , $E = 0$
- $\text{ADT/Lane} > 1350$ and Lane Width < 15 , $E = 15$
- $\text{ADT/Lane} > 1350$ and $15 \leq \text{Lane Width} < 16$,
 $E = 15 (16 - \text{Lane Width}) = \underline{\hspace{2cm}}$
- $\text{ADT/Lane} > 1350$ and Lane Width ≥ 16 , $E = 0$

$E = \underline{\hspace{2cm}}$

4. Determine the value of F:

(a) Enter the following values:

WSBIS 1370	MIN. VERT. CLEARANCE OVER DECK	<u> </u>
WSBIS 1485	STRAHNET	<u> </u>

(b) Find the value of F: (using the following conditions)

- $\text{STRAHNET} > 0$ and $\text{MIN. VERT. CLEARANCE OVER DECK} \geq 16.00$, $F = 0$
- $\text{STRAHNET} > 0$ and $\text{MIN. VERT. CLEARANCE OVER DECK} < 16.00$, $F = 2$
- $\text{STRAHNET} = 0$ and $\text{MIN. VERT. CLEARANCE OVER DECK} \geq 14.00$, $F = 0$
- $\text{STRAHNET} = 0$ and $\text{MIN. VERT. CLEARANCE OVER DECK} < 14.00$, $F = 2$

$F = \underline{\hspace{2cm}}$

5. Determine S2:

$S2 = 30 - (C + (D + E) + F)$ ($(D + E)$ cannot be more than 15)

$S2 = \underline{\hspace{2cm}}$ (points range from 0 to 30)

ESSENTIALITY FOR PUBLIC USE (S3)

1. Determine the value of G:

(a) Enter the following values:

WSBIS 1445	ADT ON INVENTORY ROUTE	<u> </u>
WSBIS 1413	DETOUR LENGTH	<u> </u>
	S1 POINTS	<u> </u>
	S2 POINTS	<u> </u>

(b) Calculate the value of G:

$G = \frac{(\text{ADT ON INVENTORY ROUTE})(\text{DETOUR LENGTH})(7.5)}{[(S1 + S2)/85](100,000)}$

$G = \frac{(\underline{\hspace{2cm}})(\underline{\hspace{2cm}})(7.5)}{[(\underline{\hspace{2cm}} + \underline{\hspace{2cm}})/85](100,000)}$

$G = \underline{\hspace{2cm}}$ (15 maximum)

2. Determine the value of H:

(a) Enter the following value:

WSBIS 1485 STRAHNET _____

(b) Find the value of H:

- STRAHNET code is 1 or 2, H = 2
- STRAHNET code is 0, H = 0

H = _____

3. Determine S3:

$$S3 = 15 - (G + H)$$

S3 = _____ (points range from 0 to 15)

SPECIAL REDUCTIONS (S4)Use only if $S1 + S2 + S3 \geq 50$ **1. Determine the value of I:**

(a) Enter the following value:

WSBIS 1413 DETOUR LENGTH _____

(b) Calculate the value of I:

$$I = (DETOUR LENGTH)^4(5.205)(10^{-8})$$

I = _____ (5 maximum)

2. Determine the value of J:

(a) Enter the following value:

WSBIS 1533 MAIN SPAN DESIGN _____

(b) Find the value of J:

- If MAIN SPAN DESIGN is 10, 12, 13, 14, 15, 16, or 17, then J = 5
- Otherwise, J = 0

J = _____

3. Determine the value of K:

(a) Enter the following coding values:

WSBIS 1684	BRIDGE RAIL	_____
WSBIS 1685	TRANSITION	_____
WSBIS 1686	GUARDRAIL	_____
WSBIS 1687	TERMINAL	_____

(b) Find the value of K:

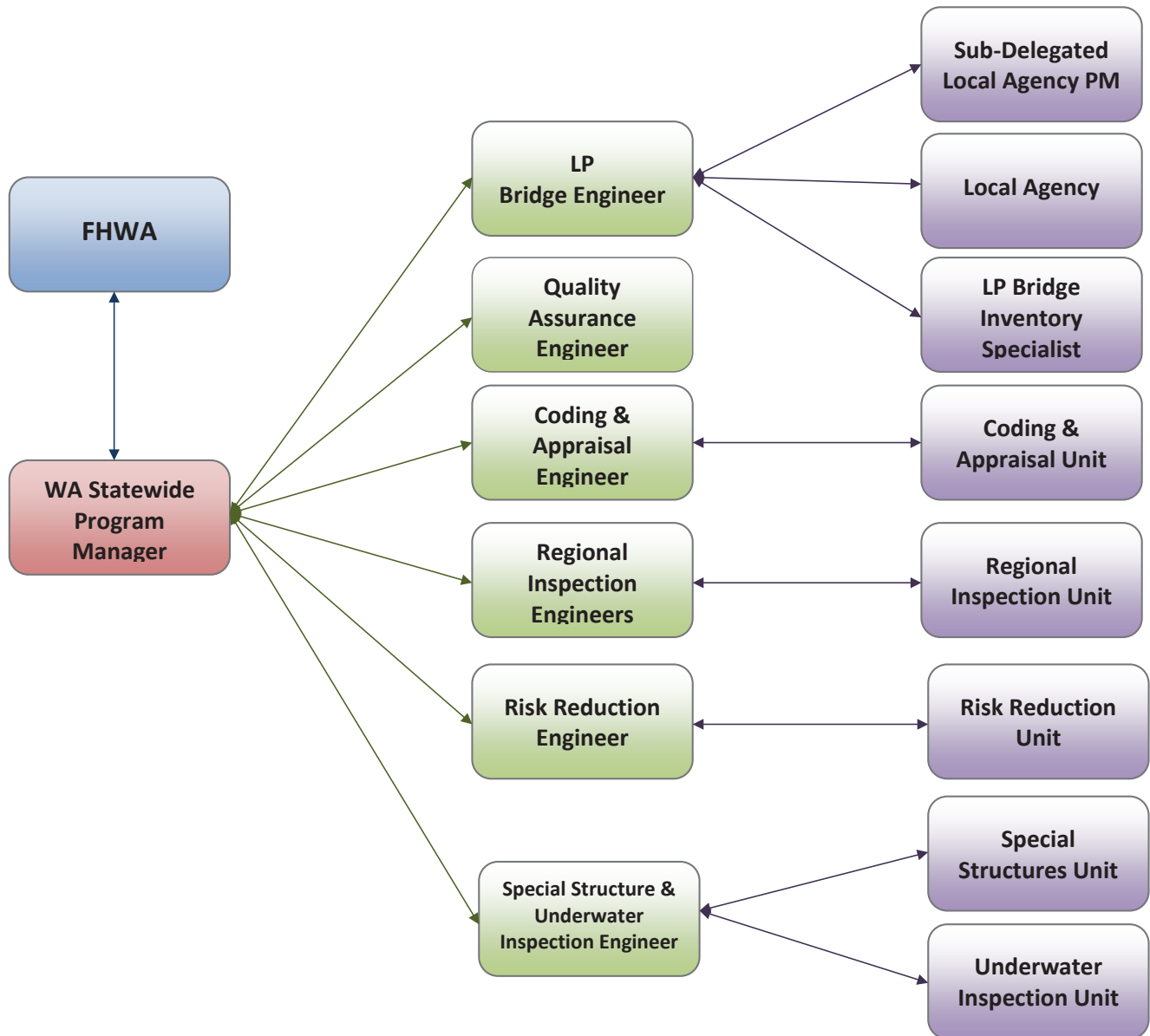
- If 2 of the above values are 0, then $K = 1$
- If 3 of the above values are 0, then $K = 2$
- If 4 of the above values are 0, then $K = 3$

$K =$ _____

4. Determine S4:

$$S4 = I + J + K$$

$S4 =$ _____ (points range from 0 to 13)



3-1 General

This chapter provides guidelines to inspect bridges*, including documentation.

The guidelines presented herein are those in use by the WSDOT Bridge Preservation Office (BPO). Local Agencies are encouraged to follow these guidelines so as to provide a consistent basis for evaluation and reporting of inspection data. Coding for non-mandatory items may deviate according to the needs of an individual agency. Agencies are encouraged to document such deviations in a manner so as to aid in the evaluation of the associated inspection data.

The basis for bridge inspection policies and procedures are referenced throughout the chapter by the updated versions of the two following manuals: The AASHTO *Manual for Bridge Evaluation* (MBE), Section 4, provides uniformity in the procedures and policies for determining the physical condition, maintenance needs, and load capacity of the nation's highway bridges.

The FHWA NHI 12-049 *Bridge Inspector's Reference Manual* (BIRM) is a manual on programs, procedures, and techniques for inspecting and evaluating a variety of in-service bridges. It provides guidelines regarding what preparation is necessary, how to inspect, what to look for, what equipment and tools are needed, how to document the results of the inspections, and provide appropriate follow-up to the inspection.

Depending on the inspection type, bridges submitted to the NBI and NTI have regular inspection intervals that must adhere to the intervals as defined within the NBIS and NTIS. When a bridge is inspected late, the agency must document a justifiable cause that pushed the inspection beyond the required interval. The justifiable cause, identified as an unusual circumstance in the preamble of the NBIS and NTIS regulation, should be documented within the inspection report. Some examples of unusual circumstances are as follows: severe weather, concern for inspector safety, concern for inspection quality, the need to optimize scheduling with other bridges, or other unique situations. The agency must also ensure that the next inspection is scheduled for the original inspection month during subsequent inspection cycles.

3-2 Inspection Types and Reporting

A number of different types of inspections have been developed to address specific needs. This section will identify and describe the inspection types used by both the state and local agencies. Below is a list of inspection types followed by a description of each inspection/report type.

- Routine (A)
- Fracture Critical (B)
- Underwater (C)
- Special Feature (D)
- Interim (E)
- Underwater Interim (F)
- Damage (G)
- Primary Safety (H)
- Secondary Safety (I)
- Condition Safety (J)
- Short Span (K)
- Two-Man UBIT (L)
- Informational (M)
- Inventory (N)
- In-Depth (O)
- Geometric (P)
- Feature (Q)

*Bridge is intended to mean all reportable structures which includes bridges, culverts and tunnels.

(A) Routine

1. **Initial Routine Inspection** – The first routine inspection performed on any bridge is the Initial Routine Inspection. It verifies the data entered into BridgeWorks via the “Inventory” Report type. An Initial Routine Inspection is also performed after rehabilitation work that changes a bridge’s dimensions or clearances, or when there is a change in bridge ownership. The initial inspection is the first inspection of a bridge and is typically reported to the NBI and NTI as a Routine inspection.

The purpose of this inspection is to add the bridge to the inventory of bridges and to establish certain baseline information.

- a. **Gathering Inventory Data** – Establishing baseline information about the bridge from the original construction plans or as-built plans can be performed in the office prior to the site inspection. Agencies shall record the required WSBIS data into BridgeWorks along with the applicable Bridge Management System (BMS) elements for the structure. Any information not known or which cannot be determined from the plans can be left blank until the site inspection.

Depending on the type of structure built, one or more of the following inspection types may also be required to be performed with the initial inspection:

- A Fracture Critical Inspection if the bridge contains fracture critical members, see (B) Fracture Critical.
- An Underwater Inspection is needed to inspect underwater portions of the bridge, see (F) Underwater Interim Inspection.
- A Special Features inspection if the bridge contains unique design or construction elements, see (D) Special Feature.

Conclusions and findings from these items should be incorporated into the Bridge Inspection Report (BIR) to support the applicable codes and ratings.

Team Leaders should coordinate the planning and timing of the inspection with the appropriate project or construction offices prior to visiting the site.

- b. **Site Inspection** – After the bridge has been built, and preferably before it is placed into service, the Team Leader must visit the bridge site to verify the inventory information that has been coded and to establish any information that was not known. At the bridge site, the Team Leader can review the information to confirm the actual bridge dimensions and clearance measurements and to verify the condition of all bridge elements.

Changes or additions to the WSBIS data, the BIR form, or BMS elements, must be noted on the inspection form and entered into BridgeWorks.

- c. **Check Coding** – The BIR form should note any inconsistencies found between the planned and the as-built bridge and should provide an explanation of any coding changes made. For example, if surface cracks have been found in a newly-poured bridge deck but these cracks do not warrant lowering the condition coding for the deck, the Team Leader should note the location and extent of the cracking so that it can be looked for and further evaluated during future inspections.

As part of the Initial Routine Inspection, two photographs of the bridge shall be taken: an elevation and a deck photograph. The elevation photograph should be taken (looking north or east) when possible to show a view from one side of the bridge. The deck photograph should be taken (ahead on station) to show a view of the bridge looking onto the bridge deck.

See (A) Routine for instructions on completing the remainder of the BIR form.

- d. **Updating the Bridge File** – The Inventory Record, the BIR, and the two photographs provide a record of the Initial Routine Inspection. In addition to being stored within BridgeWorks, these items must be placed in the bridge file created for the given bridge. Each time the bridge is revisited, additional inspection reports, any new photos, and any updates to the WSBIS and to the BIR form are added to the file so that the bridge records remain current. See Section 2-2 for further details.
2. **Routine Inspections** – Routine Inspections are regularly scheduled inspections consisting of observations, measurements, or both, needed to determine the physical and functional condition of the bridge, to identify any changes from “Initial” or previously recorded conditions, and to ensure that the structure continues to satisfy present service requirements. Generally, a regular inspection of the entire bridge is to be performed on regular intervals not to exceed 24 months throughout the life of the bridge. However, the NBIS does allow for extended inspection frequencies of up to 48 months provided the bridge meets specific criteria submitted by the State and approved in writing by the FHWA. Inspection intervals less than 24 months for specific reasons can be developed and documented by the inspecting agency if necessary. Routine Inspections are reported to the NBI and NTI.
- a. **Inspecting Bridge Components** – The BIRM describes the general inspection procedures to be followed for inspecting any concrete, steel, or timber bridge, and the specific procedures to follow for inspecting a given bridge element (i.e., the bridge abutments). These steps can be used by the Team Leader as a checklist to help accomplish the inspection and to help spot particular types of problems a given bridge or bridge element will be prone to. Following these procedures will help ensure that a thorough and comprehensive inspection is achieved.

However, specific problems not covered in these general procedures may be encountered. If that is the case, the Team Leader may contact their respective WSDOT Bridge Program Support personnel.
 - b. **Inspecting for Scour** – The Routine Inspection of any bridge over water should include an assessment of existing scour conditions, the effect of scour on the bridge, effectiveness of countermeasures, and recommendations for repair, if appropriate. The following manuals, as well as the BIRM, discuss inspection procedures for bridges over water:
 - *HEC 18 Evaluating Scour at Bridges*

The field inspection is used in conjunction with the scour analysis, see Section 5-3, to identify and verify the potential of harmful effects of scour to the bridge.

The field inspection includes the specific location and extent of any deterioration, damage, or undermining in:

- The stream channel and stream banks.
- The substructure elements (i.e., intermediate piers, pier walls, web walls, columns, or shafts).
- The foundation (i.e., footings and seals).
- Channel protection devices (i.e., dams and levees).
- Scour countermeasures (i.e., riprap or shielding).

Measure and record the extent of foundation exposure and undermining.

Recommend any repairs, replacement, or maintenance required.

Perform soundings on bridges as identified by the Scour Engineer using the Scour Field Evaluation form.

The Scour Field Evaluation form was developed to supplement the BIR for water crossings by measuring the streambed cross-section (soundings) at a bridge to document observations related to scour. A copy of this form is shown in Section 3-5.

Soundings of streambed elevations should be taken during the Initial Routine Inspection and during subsequent inspections as required. The form should note the location and depth of the streambed at each point where a sounding was taken. This information should then be plotted in order to identify long term changes in the channel cross section over time.

- c. **Bridge Inspection Report** – A Bridge Inspection Report must be prepared at the completion of each Routine Inspection to record the inspection findings, provide a narrative description of conditions at the bridge site, and note any changes in the WSBIS coding information. The Team Leader shall record and submit the findings of the Routine Inspection into BridgeWorks. A Routine Inspection will be included with a Fracture Critical Inspection and a Special Feature Inspection. Bridge Inspection Reports must be completed within 90 days from the start of the inspection. A completed report is defined as a report that has been “Released” in the BridgeWorks program.

The Bridge Inspection Report form will have the following preprinted information that will identify the bridge:

- **Bridge Number** – The bridge number given by the owner agency that is associated with the particular structure.
- **Bridge Name** – The bridge name given by the owner agency that is associated with the particular structure.
- **Structure ID** – The unique federal structure identification number associated with the particular structure in the NBI and NTI assigned by WSDOT for the life of the bridge.
- **Route** – The number of the inventory route carried on or under the bridge.
- **Milepost** – The bridge’s milepost location on the inventory route.
- **Intersecting** – The feature or features which intersect with the bridge.
- **Location** – The physical location of the bridge.
- **Structure Type** – The structure type (for local agency bridges, this field may be blank).

d. Completing the Bridge Inspection Report

- (1) At the conclusion of the Routine Inspection, confirm the condition and adequacy coding for the various bridge elements and make any changes as necessary. Review the Adequacy Appraisal codes, NBI condition codes, BMS and SNTI elements and their respective condition states, and complete the narrative describing the existing conditions. Verify that the correct Program Manager is listed on the inspection report.
- (2) Enter onto the inspection report: Team Leader initials, Team Leader identification number, Assistant Inspector initials, date of inspection, and total number of crew hours at the bridge site. The Team Leader and Assistant Inspector are required to sign the approved and released copy of the BIR that is placed in the bridge file.
- (3) Prepare a list of any bridge elements in need of repair and recommend the type of repair that should be done. A photo of repair areas should be taken with each type of recommended repair. See Section 6-4 for additional repair instructions and procedures.
- (4) If it is determined that a critical bridge deficiency has been identified resulting in an emergency load restriction, lane closure, bridge closure or a failed bridge, a Damage Inspection and/or a subsequent In-Depth Inspection may have to be performed, see (G) Damage for Damage Inspections, and (O) In-Depth for In-Depth Inspections.

e. Updating the Inventory Record – Any changes that need to be made to the Inventory Record shall be entered into BridgeWorks.

After the data is processed and updated, a new Inventory Record is generated for each bridge that has changes. On all Routine Inspections, all changes/updates to NBI and NTI data shall be released into the inventory within 90 days of the date of inspection.

The updated SI&A Report and other applicable reports shall be filed in their respective bridge file.

3. Routine Inspections with Extended Intervals – Routine Inspections with extended inspection intervals are structures with inspection frequencies greater than 24 months not exceeding 48 months, and only with written FHWA approval. Reportable structures that have administrative load ratings (WSBIS ITEM NUMBERS 1551 & 1554 = 0) are not eligible for 48 month frequencies.

The criteria approved by FHWA shall be re-evaluated after every inspection. Refer to the WSDOT letter sent to FHWA, dated July 28, 1998, see Appendix 3-C for further details. The Coding and Appraisal Unit will run an automated check annually on the entire database to ensure that the extended inspection interval is still valid and meets the criteria agreed upon between FHWA and WSDOT. Team Leaders for the State shall place the following note in the zero (0) note of the BIR within BridgeWorks for existing extended interval bridges and candidate bridges:

“Continue to validate the status of this bridge each inspection as a 48-month inspection candidate. Verify condition ratings, load ratings, vertical clearances, ADT, scour codes when applicable, and that no major maintenance has been completed in the last two years.”

The procedures and guidelines used for Routine Inspections at 24 month intervals shall be used for these structures as well.

4. **Routine Inspections with Frequencies Less than 24 Months** – Bridges or culverts should be considered for more frequent inspections if the NBI Superstructure, Substructure or Culvert code is equal to or less than a 3 and where there are multiple elements with deficiencies that reduce capacity. The SPM will approve the need to perform routine inspections more frequently than 24 months.

(B) Fracture Critical

The National Bridge Inspection Standards (NBIS) require that a Fracture Critical Inspection be performed on regular intervals not to exceed 24 months on bridge members identified as fracture critical. According to the MBE, a fracture critical member (FCM) is a steel tension member in a bridge whose failure could result in the partial or total collapse of the bridge.

This section provides information to assist the Team Leader in identifying fracture critical bridge members, preparing written procedures, planning and performing effective Fracture Critical Inspections and completing the required inspection report. The information presented here is meant as a summary of the main points of the Fracture Critical Inspection. A complete description of fracture critical members and Fracture Critical Inspection procedures are provided in the BIRM. Fracture Critical Inspections are reported to the NBI.

1. **General** – Each agency shall identify the bridges within its jurisdiction which contain fracture critical members. The agency can then identify, through documentation, the particular fracture critical members within each bridge. For the member to be considered fracture critical, two conditions must exist.
 - a. The member must be a steel member in tension. The area of the bridge where the member is located is subject to tensioning (expanding) forces.
 - b. There is no redundancy in the member or the bridge. There must be no other structural elements able to carry the load of the member if the given member fails.

There are three types of redundancy: load path, structural, and internal. Only load path redundancy is evaluated to determine whether a member is fracture critical. Load path redundancy is the number of supporting elements, usually parallel, such as girders or trusses. AASHTO neglects structural and internal redundancies in determining whether a member is fracture critical. For a bridge to be redundant, it must have more than two load paths. An exception to this is where steel three girder systems have pin and hangers. In this case, the pin and hangers are fracture critical.

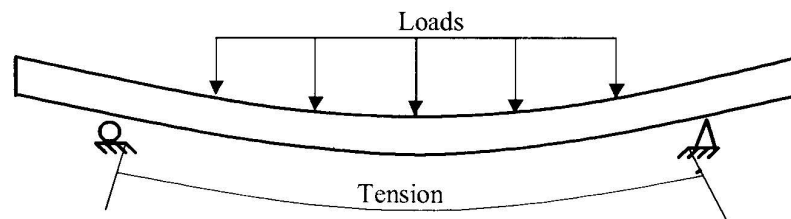
2. **Bridge Types** – The following is a list of the types of bridges in which fracture critical members will be found. Figures are also shown which illustrate these bridge types and note the location of the fracture critical areas.

a. **Steel Two-Beam or Two-Girder Systems (Exhibit 3-1)**

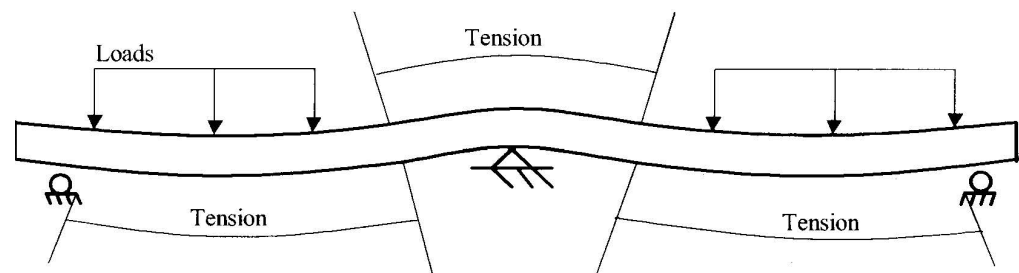
- (1) **Simple Spans** – Each beam or girder should be considered fracture critical as failure of either one could cause the bridge to collapse (Example A).
- (2) **Continuous Spans** – In general, at the midpoint of the span, the bottom of the girder should be considered fracture critical and over the pier, the top of the girder should be considered fracture critical. A structural engineer may need to assess the bridge to determine the actual redundancy and presence of fracture critical elements (Example B).
- (3) **Cantilever-Suspended Span** – In addition to the bottom of the girder at mid-span and the top of the girder over the pier, the top flange and adjacent portion of the web in the area of the cantilevered support should be considered fracture critical (Example C).

Exhibit 3-1 Steel Two-Beam or Two-Girder Systems

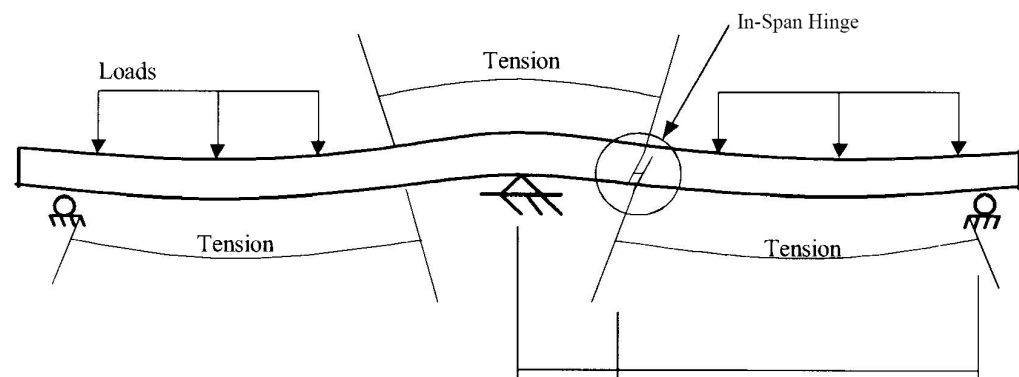
Example A: Simple Beam



Example B: Continuous Spans



Example C: Cantilever - Suspended Spans

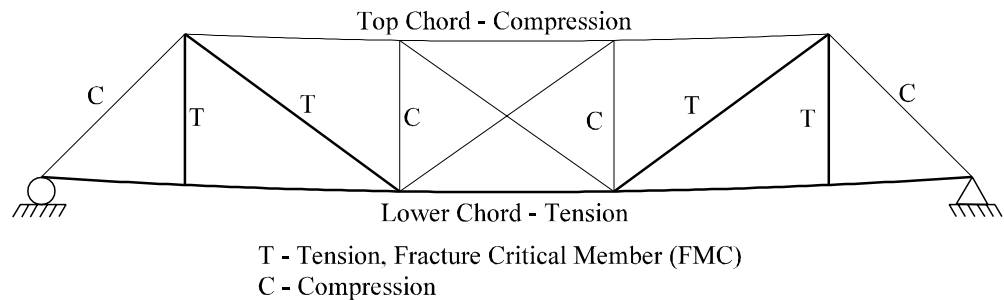


- b. **Steel Truss Systems (Exhibit 3-2)** – Most truss bridges employ only two trusses and are thus considered fracture critical. All truss members in tension should be regarded as fracture critical. The exception is, when a detailed analysis by an experienced structural engineer, verifies loss of a member would not result in collapse of the bridge or major component.

The following elements within any truss bridge should also warrant special attention:

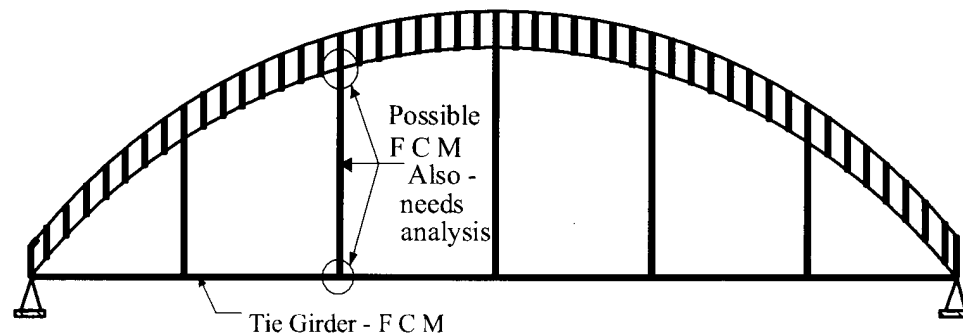
- (1) **Pin-Connections** – Any load bearing pin connection in a fracture critical member or steel three girder system is considered fracture critical.
- (2) **Category D and E Welds** – On a truss bridge, any tension member containing a Category D or E weld.

Exhibit 3-2 Steel Truss Systems



- c. **Tied Arches (Exhibit 3-3)** – The tie girder which keeps the supports from spreading apart is in tension and should be considered fracture critical.

Exhibit 3-3 Tied Arches

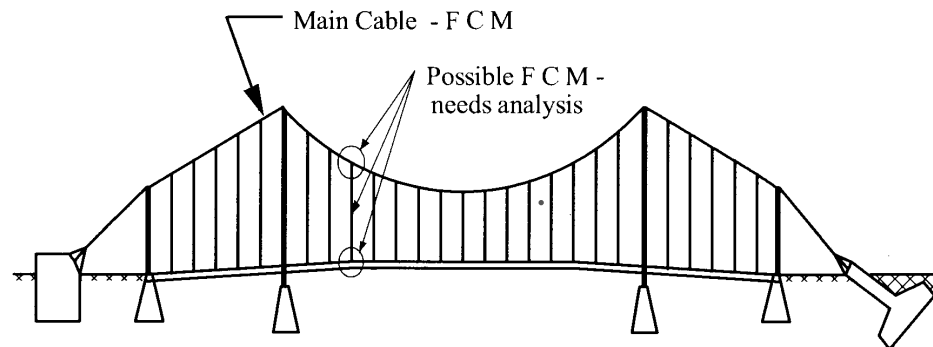


d. **Suspension Spans (Exhibit 3-4)**

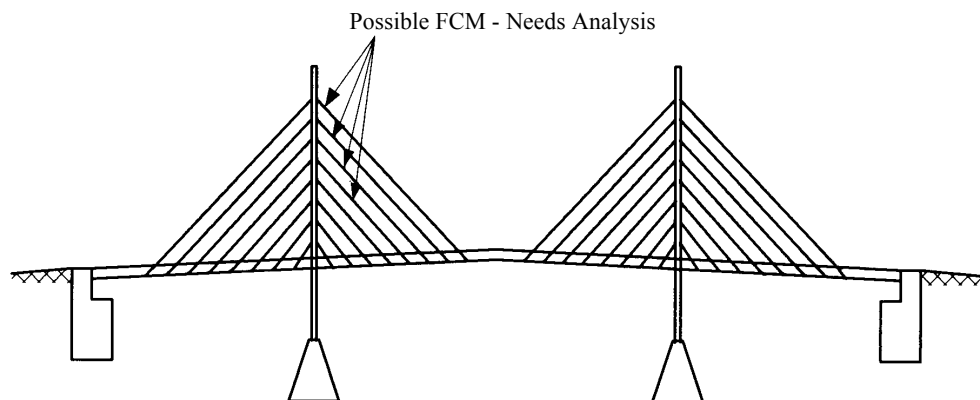
- (1) **Cables** – If the main suspension member is a cable, the cable should be considered fracture critical (Example A).
- (2) **Cable Stayed Bridge** – The bridge is of such complexity that it should be reviewed by a structural engineer to determine the criticality of the various stays to fracture (Example B).

Exhibit 3-4 Suspension Spans

Example A: Cable Suspension Bridge



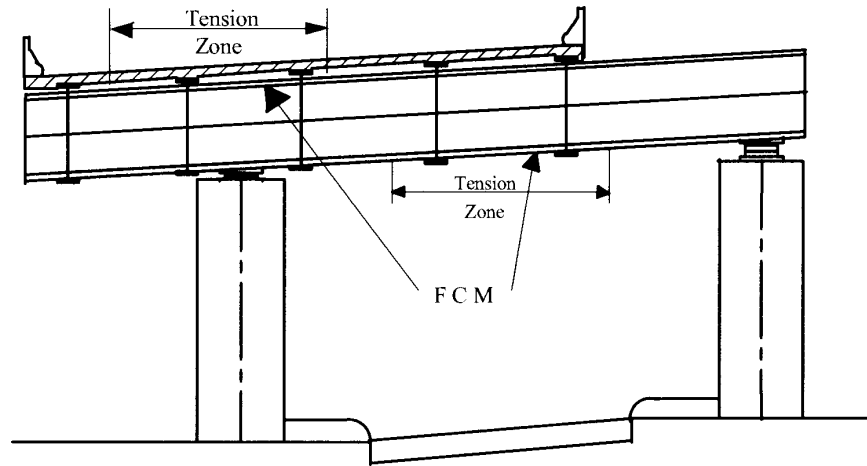
Example B: Cable Stayed Bridge



e. **Other Fracture Critical Bridge Details**

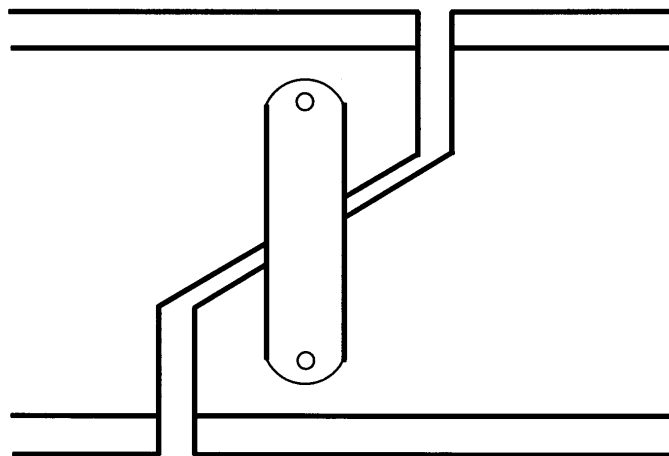
- (1) **Steel Cross Beams and Caps** – Tension zones of the I section or box beam should be considered fracture critical (Exhibit 3-5).

Exhibit 3-5 Steel Cross Beams and Caps



- (2) **Pin and Hanger Supports** – The pin and hanger connection used to support a suspended span from a cantilever span should be considered fracture critical if the member is non-redundant. The pin connection and hanger support in a two-girder or three-girder system is fracture critical as the bridge has no built in redundancy. The same connections in a multi-beam system (more than 3 beams) are not fracture critical as the bridge has a high degree of redundancy. Pin connections in such bridges should be inspected with the same techniques and methods as fracture critical pins (Exhibit 3-6).

Exhibit 3-6 Pin and Hanger Supports



3. **Prepare Written Procedures** – Once the fracture critical members within a bridge have been identified, the agency must prepare a detailed plan as to how it will accomplish the Fracture Critical Inspection. This written procedure may be developed by others being hired to perform the Fracture Critical Inspection. However, if this is done, a qualified designee from the owner agency should carefully review the written plan to ensure that a sufficient analysis of the member will be made and that the task will be accomplished in a reasonable manner. These written inspection procedures are to be kept in each bridge file.

Fracture Critical Inspections can prove costly; therefore, in the development of the inspection plan, particular attention should be given to each of the following:

- a. **Scheduling** – Generally, it will be best to schedule a Fracture Critical Inspection during cold weather (as cracks will be more visible), at low water (if the fracture critical member is underwater at high water), during daylight hours, and when traffic on the bridge will be lightest (as some form of traffic control may be necessary).
- b. **Equipment** – The Team Leader will require close access to each fracture critical member; thus, some type of equipment may be needed to provide sufficient access. Ladders, scaffolding, aerial work platforms, or UBITs may be deemed appropriate for a given situation. The choice of equipment will depend on the cost of rental, the time needed to perform the inspection using that equipment, and equipment availability. If a UBIT is used, it should be determined, before its use, whether it could overload the bridge, operate on the bridge grade, has sufficient reach, and if it might damage the deck. Use of a UBIT may also create a need for traffic control.
- c. **Workforce** – In order to keep the amount of time spent at the bridge site to a minimum, consideration should be given to the level of manpower needed. Once the number of individuals needed is determined, the duties to be performed by each individual should be clearly defined.
- d. **Tools** – The standard tools common to any Routine Inspection should be on hand for the Fracture Critical Inspection. In particular, a wire brush, a magnifying glass, and a light source able to provide 50 to 100 lumens should be considered. In addition, specialized tools for carrying out nondestructive testing may also be warranted (i.e., a dye penetrant kit or ultrasonic testing device).
- e. **Inspection Procedures** – The fracture critical member inspection plan should identify the inspection frequency and method(s) to be used. These should be developed depending on the criticality of the feature based on experience with other similar details or structures, calculated remaining fatigue life, current indications, material properties, consequences and likelihood of rapid failure, etc.

If several types of inspection are employed, identify when, where and how they are to be used. For example, a pinned truss bridge may require each of the pins to be examined visually during each inspection, supplemented by ultrasonic testing of $\frac{1}{3}$ of the pins during each inspection. Therefore, all of the pins would be inspected ultrasonically in a 72-month period, if the inspection frequency was 24 months.

4. **Perform the Fracture Critical Inspection** – The purpose of the Fracture Critical Inspection is to assess the structural condition of each bridge member identified as fracture critical. When inspecting these members, it is always best to err on the side of conservatism. The consequences of dismissing or failing to note a blemish on a fracture critical member are too great. Therefore, the inspection should be conducted carefully and thoroughly. Such close inspection of single members can be tedious; however, the Team Leader should work in a manner that insures the same degree of care and attention to the last area inspected as the first. The previous pages described the general areas within a bridge where fracture critical members will be located. The following pages describe the particular features to note.

First, the Team Leader must gain access to the fracture critical area. The Team Leader should be no further than 24 inches from the surface being inspected and should work with a light source of at least 50 to 100 lumens. The best viewing angle is at approximately 120°. The Team Leader will want to look for deteriorated surfaces or surface cracks. The BIRM discusses inspection procedures and the types of problems that may be found.

The following areas or members should be checked:

- Areas vulnerable to corrosion (under deck joints, on surfaces where water collects and in places where dissimilar materials meet).
- Areas where there is a change in the bridge cross section, where stress is concentrated, or which show out-of-plane bending.
- Web stiffeners (especially at the ends).
- Coped sections and/or re-entrant corners.
- Eyebars.
- Shear connectors.
- Pin and hanger assemblies.
- Punched holes.
- Rivet and bolt heads.
- Tack welds and field welds (especially at weld ends or returns).

If any cracks, blemishes, or other irregularities are found, the Team Leader will need to evaluate these further, which may include the use of a magnifying glass. A dye penetrant kit can be used to establish the limits of a crack. Use of magnetic or ultrasonic testing devices may be required to detect internal problems not apparent to the eye. The agency will need to determine which devices will be the most cost effective and reliable for the given situation.

Finally, the Team Leader will need to record the location and size of any cracks found. Mark and date the crack ends in permanent marker for follow up on the structure. In most cases, it will be helpful to take a photograph of such cracks to provide visual documentation. This information and the photographs are to be included in the Visual Fracture Critical Inspection Report.

5. **Prepare the Visual Fracture Critical Inspection Report** – At the conclusion of the Fracture Critical Inspection, a Visual Fracture Critical Inspection Report should be prepared to provide detailed verification of the inspection findings. The report should provide qualitative and quantitative information concerning the fracture critical member. This information is important for a number of reasons: it can offer insight about the condition of the member, it can provide a history of the bridge, and it can be used to substantiate the thoroughness of the inspection effort in the event of litigation arising from a bridge failure. See Section 3-5 for a copy of the Visual Fracture Critical Inspection Report form.

The inspection report should:

- Identify what parts of the bridge were inspected and the location of each fracture critical bridge member. (This can be shown on a photograph or sketch of the bridge.)
 - Describe the procedures followed to inspect the fracture critical member.
 - Describe the condition of the fracture critical member.
 - Provide the following details about any defects found:
 - What the defect is.
 - Where the defect is located (a sketch may be used to illustrate its location relative to the ends of the member, and its position in the cross section of the member).
 - Summarize the inspection findings (addressing how individual defects affect the member's overall condition).
 - Make any appropriate recommendations (i.e., repair the fracture critical member, recalculate load ratings, close the bridge).
6. **Updating the Inventory Record** – Any changes that need to be made to the Inventory Record shall be entered into BridgeWorks.
- On all Fracture Critical Inspections, all changes/updates to NBI data shall be released into the inventory within 90 days of the date of inspection.
7. **Updating the Bridge File** – Place the signed and completed Visual Fracture Critical Inspection Report within the bridge file. This report can be referred to if necessary to help determine the appropriate inspection frequency for the bridge, evaluate the degree to which bridge conditions have changed from one inspection to the next, and determine what maintenance or repair may be required on the bridge.
8. **Fracture Critical Inspections with Frequencies Less than 24 Months** – Fracture Critical Bridges should be considered for more frequent inspections if the NBI Superstructure or Substructure code is equal to or less than a 4 and where there are multiple elements with deficiencies that reduce capacity. The SPM will approve the need to perform Fracture Critical Inspections more frequently than 24 months.

(C) Underwater

Bridges over water have special inspection requirements. If the bridge has members in water too deep to permit a visual or tactile (hands-on and/or wading) inspection from the surface at low water or during seasonal low stream flows, an underwater bridge inspection diver must conduct an Underwater Inspection. An evaluation of the bridge's susceptibility to scour also needs to be conducted, see Section 5-3. Many bridge failures are due to underwater or scour problems; therefore, the importance of these types of inspection cannot be overemphasized. There may be environmental restrictions that need to be taken into consideration prior to conducting an Underwater Inspection.

An Underwater Inspection of submerged bridge elements is required on an interval not to exceed 60 months. The purpose of the Underwater Inspection is to examine the underwater elements to the extent necessary to determine their structural condition and adequacy. At a minimum, an underwater bridge inspection diver must swim by and examine all underwater portions of the bridge. If the underwater elements are covered with marine growth, portions of the structure need to be cleaned in order to positively ascertain the condition of the element. For concrete piers, this consists of cleaning 1 square foot patches near the surface, mid height, and bottom of all piers. For multiple pile bents, a one foot band must be cleaned near the surface, mid-height and bottom of one pile per bent, but no less than 10 percent of the piles. The underwater bridge inspection diver must also perform a visual or tactile inspection of the entire bridge footing at ground line to identify if any undermining of the footing exists, as well as probing to determine if scour holes are being filled in. If significant problems are encountered during the course of the inspection, a more detailed inspection of the bridge may be needed.

Existing scour conditions must be evaluated during an Underwater Inspection. The Team Leader must assess condition and depth of the streambed, determine the susceptibility of the streambed to scour, and determine what countermeasures can be taken to safeguard the bridge. The primary requirement of the scour inspection is to establish a cross-section of the streambed. This is accomplished by sounding and can be carried out with either a fathometer (also known as a "fish finder") or a lead line. See the BIRM and the MBE for guidance on performing Underwater Inspections. Underwater Inspections are reported to the NBI.

1. **Prepare Written Procedures** – Written inspection procedures need to be developed for each bridge requiring an underwater inspection. The inspection plan should detail as a minimum:
 - Type and frequency of required inspection.
 - Location of members to be inspected.
 - Type(s) of foundation.
 - Bottom of foundation elevation or pile tip elevation.
 - Identification of scour critical substructure units.
 - Special equipment requirements.
 - Follow-up actions taken on findings of last inspection.

2. **Document the Underwater Inspection** – Prepare a Daily Site Dive Log for each dive and prepare an Underwater Inspection Report when inspection of the entire underwater portion of the bridge is concluded.
 - a. **Daily Site Dive Log** – The Daily Site Dive Log must be completed by the inspection Team Leader (in concert with the diver). Section 3-5, provides a sample of the Daily Site Dive Log form. The form should summarize what equipment was used in the dive, what procedures were employed, what problems were encountered (such as strong currents or underwater obstructions or accumulations of debris), and should provide any information which may be helpful for planning future dives. At the conclusion of every dive, the diver must go over the inspection findings with the Team Leader in order to verify that the notes taken by the staff on the surface are a correct representation of what the diver found. The diver should also go over all underwater photos, making sure that the photo numbers and descriptions are correct.
 - b. **Underwater Inspection Report** – The Underwater Inspection Report must be completed by the underwater inspection Team Leader and reviewed by the diver. The report should be thorough and include the following information for the various levels of inspection performed.
 - (1) For a Routine Underwater Inspection, note:
 - What conditions were found as a result of the visual inspection or cleaning.
 - The condition of any protective coatings.
 - Evidence of any significant defects or damage.
 - Evidence of scour or the build-up of debris at the piers.
 - The location of exposed foundation elements.
 - Ground line elevations at the base of all piles or pile groups, elevations of the tops of all exposed footings and/or seals, and ground line elevations of all footings or seals at their corners.
 - The condition of the streambed around each pier, including a description of any placed rock.
 - The water flow (whether high, medium, or low) and an approximation of the velocity (ft/sec.).
 - The influence of any significant environmental conditions (i.e., corrosive pollutants, salt water, etc.).
 - Any changes to the surrounding area which have or may alter the flow characteristics around the pilings or piers (i.e., logs upstream, construction going on nearby).
 - Any discrepancies between the bridge design and its actual configuration.
 - Any recommendations for repairs, a subsequent scour inspection, a change in inspection frequency, or an in-depth inspection.
 - (2) For an Interim Inspection, note:
 - The specific areas inspected.
 - The amount and type of testing performed.
 - Testing results and/or findings.
 - Any recommendations for repair

In addition to the written information provided in the Underwater Inspection Report, problem areas in the bridge should be carefully identified and documented with drawings, photographs, and/or video recordings. Although underwater photos and video recordings are often preferred, they may not always offer clear views of the problem areas so sketches and drawings are always needed to document findings.

3. **Updating the Inventory Record** – Any changes to the applicable inventory coding information (the date of underwater inspection, Team Leader initials, inspection hours and changes to the condition coding for the substructure) shall be entered so that the Inventory Record can be updated accordingly. On all Underwater Inspections, all changes/updates to NBI data shall be released into the inventory within 90 days of the date of inspection.
4. **Updating the Bridge File** – The completed Underwater Inspection Report and an updated copy of the Inventory Record shall be placed in the bridge file. These reports can be referenced to as necessary to help determine the appropriate inspection frequency for the bridge, to evaluate the degree to which bridge conditions have changes from one inspection to the next, and to determine what maintenance or repair may be required.
5. **Underwater Inspections with Frequencies Less than 60 Months** - Bridges that require an Underwater Inspection should be considered for more frequent inspections if the NBI Substructure code is equal to or less than a 4, or the Scour code is equal to or less than a 2 and where there are underwater elements with deficiencies that reduce capacity. The SPM will approve the need to perform Underwater Inspections more frequently than 60 months.

(D) Special Feature

Bridges with special features include structures such as movable bridges, floating bridges, suspension and cable-stayed bridges, and ferry terminals. Also included are bridges built with special materials such as high strength steel, and bridges that were built using techniques such as segmentally constructed post-tensioned concrete boxes. Bridges with pin and hanger connections are also considered to be special feature bridges. Written procedures must be developed and included in the bridge file for all Special Features Inspections. Procedures should include:

- Type, detail, and frequency of required inspection.
- The location of members to be inspected.
- Special equipment required.

The first four bridge types listed below are considered “Complex Bridges” according to the NBIS. The remaining types are inspected as suggested by FHWA. See Appendix 3-D on FHWA letter for Bridge Special Feature Inspections. Special Feature Inspections are performed on regular intervals not to exceed 24 months. Special Feature Inspections are reported to the NBI.

1. **Movable Bridges (Code ‘1’ in BridgeWorks)** – There are three basic types of movable bridges: vertical lifts, bascules, and swings. All of these structures are operated by either electro-mechanical drive systems or hydraulic systems. See the BIRM and the MBE for guidance on performing inspections on movable bridges.

2. **Suspension Bridges (Code '3' in BridgeWorks)** – Suspension bridges consist of a pair of main cables hanging between and passing over two towers and anchored by backstays into large counterweights on opposite shores. Suspender ropes hang from the main cables and support a pair of stiffening trusses or girders that run the length of the suspended spans. The stiffening trusses or girders support floor beams, stringers, and a roadway deck. Orthotropic decks may be used in place of the stringers and roadway deck. See the BIRM and the MBE for guidance on performing inspections of suspension bridges.
3. **Cable-Stayed Bridges (Code '9' in BridgeWorks)** – Cable-stayed bridges are very distinct structures with many unique details that require special inspection. On a cable-stayed bridge the longitudinal structural components that support the road deck are supported by inclined cables or stays that extend directly into anchors or saddles in one or two towers. One cantilevered component is balanced by another cantilevered component on the opposite side of the support tower. Typically, the deck is anchored to the ground in at least one spot to resist seismic forces and any unbalance in the cantilevered spans. See the BIRM and the MBE for guidance on performing inspections on cable-stayed bridges.
4. **Segmental Bridges (Code '5' in BridgeWorks)** – Segmental bridges are unique due to their construction. A segmental girder is a single or multiple box girder that is formed from segments post-tensioned together. This type of construction takes advantage of the standardization of the manufacturing process. See the BIRM and the MBE for guidance on performing inspections of concrete segmental bridges.
5. **Floating Bridges (Code '2' in BridgeWorks)** – Floating bridges in Washington State consist of concrete pontoons that are bolted together longitudinally and are held in position by steel cables connected to anchors on the bottom of the waterway. Some of the bridges are reinforced with prestressing steel. Two of Washington State's floating bridges contain movable spans that have unique operating characteristics.
6. **Ferry Terminals (Code '6' in BridgeWorks)** – Ferry Terminals (Code '6' in BridgeWorks) – Ferry terminals usually have a dock or holding area built over the water and a transfer span to carry traffic onto the ferry deck. The holding area can be constructed of treated timber, concrete, or steel components. The vehicle holding area or "dock" is typically considered a standard bridge structure and receives a Routine and Underwater Inspection. The transfer spans generally are steel trusses or girders with one end supported on the fixed pier and a free end which can be raised or lowered onto the boat to accommodate tidal changes. Transfer spans typically have their own structure I.D. and these structures are the ones with unique features which require the "Special Feature" inspection. Ferry Terminal transfer spans have enough unique features that specific BMS elements and inspection procedures have been developed to help the inspector navigate through a ferry terminal inspection. The *Ferry Terminal Inspection Procedures Manual* is published as a stand-alone document and can be found as publication M 3105 at www.wsdot.wa.gov/publications/manuals/M3105.
7. **Pin and Hanger Connections (Code '4' in BridgeWorks)** – A pin and hanger is a system used to connect suspended spans to cantilevered spans. The hanger is connected to a beam or girder by a pin on one or both ends. In two-girder and three-girder systems, the pin and hanger connection is fracture critical. Even when used in a multi-beam system where the bridge has a high degree of redundancy, the connection should still be inspected as closely as any fracture critical element. This is due to problems experienced in other states with pins in multi beam suspended spans. See the BIRM and the MBE for guidance on performing inspections of pin and hanger assemblies.

8. **A-514 High Performance Steel (Code '7' in BridgeWorks)** – A-514 steel is used in high stress areas of larger steel bridges to reduce member size and total weight of steel. A typical location would be the top and bottom flanges of plate girders over the intermediate piers.

Bridges fabricated from A514 steel have suffered from hydrogen cracks which occurred during fabrication. Also, higher strength steels generally are subject to larger stress ranges than the lower strength steels. In tension zones, cracks may initiate and propagate faster than in the lower strength steels. It is important that Team Leaders check tension zones closely for cracks particularly at welds, bolt holes, copes, and other fatigue prone locations.

The Team Leader and Assistant Inspector are required to sign the approved and released copy of the Special Feature Report that is placed in the bridge file.

(E) Interim

Special inspections as defined in the MBE are called Interim inspections in the state of Washington. This inspection type is scheduled when a particular known or suspected deficiency needs to be monitored between Routine Inspections. Interim Inspections are not reported in the NBI or NTI.

1. **Identifying Need** – The Interim Inspection is performed to monitor a particular known or suspected deficiency and is carried out between regularly scheduled Routine Inspections. For example, if noticeable settling has occurred in the foundation, or if a particular bridge member shows signs of rapid deterioration. The Team Leader should observe and monitor this condition to determine the effect on the bridge or the danger posed to the bridge. Bridges or culverts should be considered for an Interim Inspection if the NBI Superstructure, Substructure or Culvert code is equal to or less than a 3.

The inspection interval may vary depending on the type of deficiency being inspected. Interim Inspections may occur between regularly scheduled Routine Inspections on 24 month intervals, typically on the off year of the Routine Inspection. There are cases where Interim Inspections may occur several times during a calendar year on three or six month intervals. The inspecting agency along with the Team Leader will determine the appropriate inspection interval.

Consider performing an Interim Inspection for load posted bridges. The Interim Inspection should occur in the year that the Routine Inspection is not due.

2. **Performing Inspection** – The Team Leader is free to schedule an Interim Inspection as the need arises. This type of inspection can be accomplished by any Team Leader who has some familiarity with the bridge. If someone other than the Team Leader who performed the Routine Inspection is scheduled to perform the Interim Inspection, they should be carefully instructed as to what to look for, what measurements to take, what results might be expected, and/or how the problem can affect the structural integrity of the bridge.
3. **Reporting** – A BIR documenting the inspection findings should be prepared by the individual who performed the inspection. Any of the following information may be appropriate to include:
 - The date of Interim Inspection.
 - The Team Leader's name.
 - The applicable inspection interval.

- The location of the element or elements inspected.
 - Any measurements taken.
 - The procedures utilized to analyze and assess the given bridge element(s).
 - The results of any testing performed.
 - Any recommendations for maintenance or repair.
4. **Updating the Inventory Record** – Any changes that need to be made to the Inventory Record shall be entered into BridgeWorks. The Routine inspection date should not be changed due to an Interim Inspection. On all Interim Inspections, all changes/updates to NBI and NTI data shall be released into the inventory within 90 days of the date of inspection
 5. **Updating the Bridge File** – A copy of the report and an updated copy of the Inventory Record (if applicable) must be placed in the bridge file at the completion of the Interim Inspection and must be cross referenced to the current Bridge Inspection Report.

(F) Underwater Interim

This inspection type is scheduled when a particular known or suspected deficiency needs to be monitored between the regularly scheduled Underwater Inspections. Underwater Interim Inspections are not reported in the NBI.

1. **Identifying Need** – Common examples of findings requiring a change in the Underwater Inspection frequency are extensive scour or rapidly progressing deterioration. For example, spread footings normally buried and not visible for inspection which become exposed, or pile founded footings which become undermined need to be monitored closely. Foundation deterioration or damage may also warrant a visual inspection at a frequency less than the mandatory 60 months. Bridges should be considered for an Interim Underwater Inspection if the NBI Substructure code is equal to or less than 3.

The inspection interval will vary depending on the type of deficiency being monitored, and how rapidly the deterioration may be progressing. For scour related findings where a normally buried spread footing is found exposed, or in the case of a pile supported footing which becomes undermined, the Interim Inspection is placed on a 12 month frequency. During subsequent Interim Inspections, the frequency may be adjusted upwards if the scour is determined to be stable and non-threatening to the structure. Adjusting a scour related Interim Inspection frequency upwards is done slowly over time, i.e., 12 months, 24 months, 36 months ect., until the maximum 60 month inspection frequency is reached. For non-scour related Underwater Inspection findings (i.e., foundation damage or deterioration) the Underwater Interim Inspection frequency will usually be set at 24 months. There may be cases where Interim Inspections should occur several times during a calendar year on three or six month intervals. The inspecting agency along with the Team Leader will determine the appropriate inspection interval.

Consideration should be given to performing an Underwater Interim Inspection for load posted bridges, provided the load restriction is due to element's that are only visible by Underwater Inspection techniques.

2. **Performing Inspection** – The underwater BIR will have specific language pertaining to the portions of the bridge needing the Interim Inspection, and what measurements need to be made. The Team Leader should carefully review the past inspection reports to become familiar with the bridge, and to assure that the correct portions of the bridge receive the Interim Inspection.
3. **Reporting** – A BIR documenting the inspection findings should be prepared by the individual who performed the inspection. Any of the following information may be appropriate to include:
 - The date of Interim Inspection.
 - The Team Leader's name.
 - The applicable inspection interval.
 - The location of the element(s) inspected.
 - Any measurements taken.
 - The procedures utilized to analyze and assess the given bridge element(s).
 - The results of any testing performed.
 - Any recommendations for maintenance or repair.
4. **Updating the Inventory Record** – Any changes that need to be made to the Inventory Record shall be entered into BridgeWorks. The Underwater Inspection date should not be changed due to an underwater Interim Inspection. On all Interim Inspections, all changes/updates to NBI data shall be released into the inventory within 90 days of the date of inspection.
5. **Updating the Bridge File** – A copy of the report and an updated copy of the Inventory Record (if applicable) must be placed in the bridge file at the completion of the Interim Inspection and must be cross referenced to the current bridge inspection report.

(G) Damage

A Damage Inspection is an unscheduled one-time inspection to assess structural damage resulting from an environmental or human event. The scope of inspection should be sufficient to determine the need for emergency load restrictions or closure of the bridge to traffic, and to assess the level of effort necessary to define a repair. Depending on the specific situation, a Damage Inspection may be cause to initiate Interim inspections. This determination is typically made by the Team Leader or their supervisor. Damage Inspections are not reported to the NBI or NTI.

Damage Inspections are categorized by type based on the damage received or how it was found or is being reported. Team Leaders should create a Damage Inspection Report in BridgeWorks and choose one of the following events:

- | | |
|---|--|
| • A – Over Height | • H – Bridge Rail |
| • B – Lateral Damage to Vertical Member | • O – Other |
| • E – Flood | • S – Reported by Others - Overheight |
| • G – Earthquake | • T – Reported by Others – Lateral |
| | • U – Reported by Others - Bridge Rail |

Damage Inspections do not have scheduled inspection frequencies but subsequent In-Depth and/or Interim Inspections may be scheduled as a result of the damage to monitor the structure over time.

If called upon to perform a Damage Inspection, Team Leaders should get familiarized with the type of bridge and the location of the damage. Office review of as-built plans and photos should take place prior to inspecting the damaged structure.

1. **Assess Damage** – When damage occurs as a result of collision, earthquake, or other forces, a thorough examination of the damaged areas should be made, along with an assessment of any residual damage to other bridge components. The amount of time and effort required to make this assessment will depend upon the extent and seriousness of the damage.

If significant damage has occurred, the Team Leader will need to:

- Identify any fractured members.
- Determine any loss of foundation support.
- Compute the amount of any section loss.
- Measure the amount any member is out of alignment.
- Inform the bridge owner that an updated load rating may be necessary.

Any time flooding has occurred on the waterway the bridge crosses, an inspection should be conducted both during and immediately after the flooding to assess what effects the increased water flow is having, or had, on the bridge. The following explains these procedures:

- (a) **During Event Inspection** – An inspection during the flood can provide information about the structure's safety and condition under adverse conditions. Observations made during the flood may help the Team Leader recommend appropriate measures to protect the bridge from failure or damage due to any future flooding.

To the extent possible during the flood, the Team Leader should look for the suggestion or the presence of any of the following:

- Streambed scour around underwater bridge elements.
- Bank erosion.
- Lateral migrations in the channel.
- Sediment transport or accumulation.
- Debris transport or accumulation (especially around piers).

- (b) **Follow-up Inspection** – The bridge should be revisited immediately after the flood to assess any damage to the bridge and to provide information about the actual impact of the flood. The Team Leader should assess the impact of any of the following:

- Streambed scour around underwater bridge elements.
- Bank erosion.
- Lateral migrations in the channel.
- Sediment transport or accumulation.
- Debris transport or accumulation (especially around piers).

2. **Critical Damage-Bridge Repair Report (CDBRR)** – If the bridge has been damaged to the extent that has resulted in an emergency load restriction, lane closure, or a bridge closure, a CDBRR, which is part of the Bridge Damage Report, shall be used, see Section 6-2 for further instructions. A copy of this report shall be entered into BridgeWorks and another copy shall be sent to FHWA for initial report and any subsequent updates.

3. **Reporting** – After a Damage Inspection Report has been created within BridgeWorks, descriptions and comments shall be added under the appropriate BMS elements describing the damage. A Bridge Damage Report is also required for all Damage Inspections performed by the state, See Section 6-2 for further instructions.

Add the damage photos and revise the BMS condition state codes if necessary. The following information should also be noted:

- The location, extent, and type of any damage found.
- The amount of any section loss.
- The degree to which any members are out of alignment.
- The need for new load ratings, if applicable.
- Any recommendations for repair or maintenance.
- Vertical clearance at the point of impact and at the minimum opening of the span on over height damage inspections.

For prestressed concrete or steel bridges fill out the Prestressed Concrete and Steel Damage Report form or equivalent to supplement the Bridge Damage Report, see Section 3-5.

If the bridge is damaged as a result of the flood or if conditions have changed at the bridge site, a Bridge Damage Report and a new Scour Field Evaluation form must be completed. If the bridge is a scour critical structure, the instructions within the Plan of Action (POA) should be followed, see Section 5-3.2.

The report should provide the following information:

- Flood stage at which the bridge was visited. This information can be found at the NOAA National Weather Service website.
- Approximate streamflow volume and velocity at the time of the visit. This information can be found at the NOAA National Weather Service website.
- Location and extent of any damage to the bridge.
- Current condition of any bridge elements affected by the flood.
- Any recommendations for scour countermeasures, bank protection, channel protection, etc., which may protect the bridge from damage during future flooding or reduce the potential for future flooding.

When printing Bridge Damage Reports, only include the BMS elements, photos, repairs and files that pertain to the damage.

4. **Updating the Inventory Record** – If any changes to the Inventory Record (the inventory or load ratings, for example) are needed, they must be entered into BridgeWorks. On all Damage Inspections, all changes/updates to NBI and NTI data shall be released into the inventory within 90 days of the date of inspection.
5. **Updating the Bridge File** – A copy of the BIR and an updated copy of the Inventory Record (if applicable), a copy of the Bridge Damage Report and all other applicable forms and drawings shall be placed in the bridge file at the completion of the Damage Inspection.

(H) Primary Safety

A Primary Safety Inspection (H) is used by an agency that chooses to inspect a structure owned by another agency. Some examples include:

- a railroad bridge over a state or local agency route
- a local agency owned pedestrian bridge over a state route
- a state owned bridge carrying traffic over a local agency route

Agencies that own the structure and maintain a record in WSBIS cannot use the primary safety report types.

This inspection is performed at the discretion of the agency which has an interest in the structure, and the inspection scope and frequency is also entirely determined by that agency. These inspections are not reported to the NBI or NTI, and are not subject to the NBIS or NTIS. Generally speaking these inspections are intended to assess the safety of the structure for any immediate hazard to the route crossing under it, and the inspection is directed to only those portions of the structure that could affect that undercrossing route.

The agency performing a primary safety inspection should limit inspection notes to BMS element 378 – Undercrossing Primary Safety. Repair recommendations should be limited to only those findings that directly affect the safety for users of the route under the bridge. In cases where the bridge owner also maintains an inspection record in WSBIS, the repair can be added to the repair report. In cases where the bridge owner doesn't use WSBIS (most railroads for example), entering repairs into the repair report will need to be supplemented with direct contact with the structure owner.

(I) Secondary Safety

A Secondary Safety Inspection is used by an agency that chooses to inspect a structure owned by another agency in cases where 3 agencies have an interest in the structure – the owning agency and two agencies with routes under the structure. The only current example is a sound transit structure with a record maintained in WSBIS that crosses over both state and local agency routes. In this case, the state would maintain the primary safety report type and the local agency would maintain the secondary safety report type.

Agencies that own the structure and maintain a record in WSBIS cannot use the secondary safety report types. All notes for the secondary safety inspection should be located in BMS Element 379 – Undercrossing Secondary Safety.

In all other respects, the primary safety and secondary safety report types are similar, see the primary safety report type for additional information.

(J) Condition Safety

A Condition Safety inspection is used in cases where an agency owns a structure that is not reportable to the NBI or NTI but is using WSBIS to maintain a comprehensive record of the structure for both public safety and long term maintenance. Examples include:

- A state or local agency pedestrian bridge, regardless of whether or not it crosses over a state or local agency route.
- A bridge that is undergoing phased construction and may require an inspection before final configuration.
- A transit structure where the owner chooses to maintain a record in WSBIS, again regardless of whether or not it crosses over a state or local agency route.

Short Span Inspections and Report types are separate from Condition Inspection and Report Types. See (K) Short Span.

This inspection is performed at the discretion of the agency which owns the structure, and the inspection scope and frequency is also entirely determined by that agency. These inspections are not reported to the NBI or NTI, and are not subject to the NBIS or NTIS. Generally speaking these inspections are intended to ensure both public safety and long term maintenance of the entire structure. In this regard they are similar to routine inspections, but without specific federally mandated requirements for inspection frequency, level of detail, or appraisal coding.

(K) Short Span

Short Span (I) – This inspection type is used for bridges/culverts that have an opening of 20 feet or less. This is measured along the center of the roadway between undercopings of abutments, spring lines of arches, or extreme ends of openings for multiple boxes. Short Span bridges may also include multiple pipe culverts, but the clear distance between openings must be less than half of the smaller contiguous opening. Short Spans are not reported to the NBI.

Even though short span bridges are not reported to the NBI, there remains concern about their deterioration and performance. Therefore, it is recommended that agencies inspect short span bridges similar to a full NBI inspection for informational purposes. The frequency of the inspections for these bridges will be at the discretion of the owner agency. An Assistant Inspector who has 3 years of bridge condition inspection or the approval of their supervisor and has successfully completed a FHWA approved comprehensive bridge inspection training course can perform as a Team Leader for Short Span Inspections.

1. **Inspection Criteria** – Inspections are recommended for the following short span bridges:
 - Timber structures that meet the criteria in Appendix 3-A1 and Appendix 3-A2.
 - Single span concrete or metal structures, other than metal corrugated pipes that meet the criteria in Appendix 3-A1 and Appendix 3-A2.
 - Multiple span structures that meet the criteria in Appendix 3-A3.
 - Metal corrugated pipes with an opening greater than 8 feet.
 - Multiple pipes with a structure length from 10 feet to 20 feet, see (1340) in Appendix 2-C for structure length definitions.

This criteria is presented as a guideline and is not intended to replace sound engineering judgment. When in doubt, a conservative approach should be taken.

- a. **Short Span Bridges Inspected** – If the short span bridge is inspected, agencies should follow these guidelines on reporting:
 - (1) Fill in all the applicable fields listed on the WSBIS coding form. The bridge number should be unique for short span bridges.
 - (2) Take deck and elevation photographs.
 - (3) Fill out the Scour Field Evaluation form (if applicable).
 - (4) Complete a BIR.

- (5) Determine the frequency of inspection needed. Recommended frequencies are as follows:
 - **12 Months** – Timber with red/yellow tags, any other material in poor condition needing monitoring, scour issues, load posting, etc.
 - **24 Months** – All other timber structures, any other material that has BMS elements in Condition States 3 or 4.
 - **48 Months** – Metal structures in good condition and concrete structures with minor problems.
 - **72 Months** – Concrete structures in good condition.
- (6) Submit the data through normal bridge inspection reporting procedures.
- b. **Short Span Bridges Not Inspected** – If the short span bridge is not inspected, the following are some guidelines to follow:
 - (1) WSDOT Team Leaders should note the milepost, type of bridge, features carried, features intersected, take elevation and deck photographs, and notify maintenance personnel that future inspections of the bridge are their responsibility.
 - (2) Local Agency Team Leaders should note the milepost, type of bridge, features carried, features intersected, take elevation and deck photographs, and determine if the need for any future inspection of the bridge is necessary and coordinate with their maintenance personnel.
2. **Performing the Inspections** – The inspection procedures for short span bridges are the same as those for NBI bridges.

An Underwater Inspection is performed on short span bridges with structural elements underwater. If the Team Leader is unable to assess the condition of the elements either visually or by probing, an underwater bridge inspection diver must conduct the Underwater Inspection. This inspection determines the structural condition and adequacy of the short span bridges underwater elements.
3. **Updating the Inventory Record** – Following the inspection procedures used on NBI bridges insures consistency of reporting. State-owned bridges are added to the WSDOT Bridge List while local agency bridges are added to their own local inventories.

After the bridges are inspected, the procedures for creating and updating the Inventory Record are followed. On all short span inspections, all changes/updates to the data shall be released into the inventory within 90 days of the date of inspection.
4. **Updating the Bridge File** – The minimum information maintained in the bridge file for short span bridges should include:
 - a. Inventory data, including location maps.
 - b. Completed inspection forms.
 - c. A sketch of the bridge showing dimensions and depth of fill (barrel length should be taken as one pass distance, regardless of the number of barrels).
 - d. Deck and elevation photographs
 - e. Scour Field Evaluation Form (if applicable).
 - f. Correspondence.

(L) Two-Man UBIT

This inspection type is used when the UBIT, its driver and the UBIT operator are supplied to an outside agency by the BPO, but the responsibility for the inspection and reporting resides with the Team Leader. The sole purpose of this inspection type is to facilitate the scheduling of future inspections and the internal accounting and billing of current inspection work. The frequency for Two-Man UBIT inspections is set by the Local Agencies. This inspection type is not reported to the NBI.

1. **Identify Need** – Through signed agreements between the State and Local Agencies, the State can assist those agencies with inspections requiring the use of specialized equipment by performing two-man UBIT inspections.

The inspection interval may vary depending on terms of the agreement between the State and the Local Agency. The Local Agency shall determine the level and inspection interval for their structures within the agreement.

2. **Performing the Inspection** – Typically, an Assistant Inspector and UBIT driver will make up the inspection team that represents the State. A Local Agency Team Leader will accompany the state team to perform the inspection. The Assistant Inspector will coordinate with the Local Agency Team Leader as to how the work will proceed for the time period assigned.
3. **Updating the Inventory Record** – The responsibility of generating the BIR and editing the WSBIS and any applicable inspection forms and entering the data into BridgeWorks shall reside with the Team Leader from the Local Agency.
4. **Assistant Inspector/Local Agency Team Leader Responsibilities** – The Assistant Inspector from the State or the Local Agency Team Leader under advisement of the State Assistant Inspector shall ensure that the following items are completed during and after the inspection of each local agency bridge.
 - a. While at the bridge site, take a Deck and Elevation photo of the structure.
 - b. Log the actual UBIT hours on site.
 - c. Create a Two-Man inspection type within BridgeWorks.
 - d. Enter the Local Agency Team Leader's initials as ZZZ and a certification number of Z9999.
 - e. The bucket operator's initials will be entered as the Assistant Inspector. The Assistant Inspector should attach the deck and elevation photos taken at the site into BridgeWorks.
 - f. Add the appropriate resources and dates for future inspections.

(M) Informational

This report type is used as a means to add notes, data, files or photos to a report between scheduled inspections. Additionally the Informational Report can be used to change the inspection frequency if necessary or to just assign a next scheduled inspection date without having to change the normal inspection frequency. An Informational Report type does not involve field work and is typically used by inspection staff and the Bridge Information Group. Data that is updated through an Informational Report can be accessed from the SI&A report on BEIS. Depending on the type of data updated through an Informational Report, it may be

necessary to print out and sign a new report for scanning into BEIS. This will be determined by the Team Leader and their supervisor. An example of an Informational Report that may require a signature is one that changes the NBI or Bridge Management System (BMS) or SNTI codes. In these cases, a statement in the applicable area of the notes section of the report should state why the changes made were made. Informational Reports are not reported in the NBI or NTI. An Assistant Inspector who has 3 years of bridge condition inspection experience or the approval of their supervisor and has successfully completed a FHWA approved comprehensive bridge inspection training course can create an Information Report.

(N) Inventory

This report type is used to notify the inspection team that a structure is either new or altered and needs field verification to track construction progress and update the record when the work is completed. This report type will also provide detailed information on the new or altered structure to assist the inspection team in field verification. This report type is intended to stay in the bridge record until the construction work is completed, then removed thereafter.

For WSDOT structures, the Inventory report type is always created and removed by the BPO Information Group, and is closely coordinated with the ContractHistory database. BPO inspection teams shall always review the information in an inventory report type and update the record as needed, including clearly indicating when the construction work is completed.

Examples of construction work that tracked by this report type include:

- New structures
- Retrofits and rehabilitation (deck replacement, seismic retrofits, strengthening, etc)
- Any new or replaced BMS elements (new joints, rails, overlays, etc)
- Utility work
- Roadway alterations UNDER bridges that affect vertical and horizontal clearances (new pavement, roadway widening, etc)
- Functional changes (bridge changed from 2 way to 1 way traffic due to construction of new parallel bridge, for example)

Examples of construction work NOT tracked by this report type include:

- Repair work tracked in the Repair List
- Any changes to the structure record which are not performed in the field by inspectors (updated ADT, NHS designation, etc)

An Assistant Inspector who has 3 years of bridge condition inspection experience or the approval of their supervisor and has successfully completed a FHWA approved comprehensive bridge inspection training course can create an Inventory Report. This report type is not reported to the NBI or NTI.

(O) In-Depth

Any time a bridge element or portion of the bridge requires further evaluation, analysis, or investigation to accurately assess its condition, complete an In-Depth Inspection. This inspection may involve testing, monitoring, or conducting specific analyses of given bridge elements. In-Depth Inspections are performed as needed and do not have a set inspection frequency. They are not reported in the NBI or NTI.

1. **Identify Need** – Any time the structural condition of an element cannot be determined in the course of a Routine Inspection, an In-Depth Inspection may be required. The In-Depth Inspection is performed to obtain more sophisticated data, perform special testing, and/or bring in other experts to assess a particular problem.

The need for an In-Depth Inspection generally arises as a result of a Routine Inspection; however, such a need may also be the result of a damage, flood, or Interim Inspection. Whenever such a need is discovered, an In-Depth Inspection should be performed.

In-Depth Inspections do not have inspection intervals and are treated as one-time only inspections. If the inspecting agency feels that subsequent inspections are needed on regular intervals, Interim Inspections should be utilized instead.

2. **Performing the Inspection** – The In-Depth Inspection should include as detailed analysis as necessary to determine the condition of the given bridge element. There can be no standard set of procedures to follow or observations to be made. Many factors will influence the depth and extent of analysis required. To facilitate accomplishment of the inspection, the Team Leader should make sure that any traffic control measures or necessary special equipment will be available.
3. **Reporting** – There is no standard form to be completed for reporting In-Depth Inspection findings. When the inspection is concluded, the Team Leader should prepare a BIR along with any additional documentation to note:
 - The location of each bridge element inspected.
 - The procedures used to analyze and assess the particular bridge element.
 - The names, titles, and observations made by any specialists who were consulted.
 - The results of any testing performed.
 - Any recommendations for maintenance or repair.

4. **Updating the Inventory Record** – Any changes that need to be made in the Inventory Record shall be entered into BridgeWorks.

On all In-Depth Inspections, all changes/updates to NBI or NTI data shall be released into the inventory within 90 days of the date of inspection.

5. **Updating the Bridge File** – A copy of the report and an updated copy of the Inventory Record.

Record (if applicable) shall be placed in the bridge file at the completion of the In-Depth Inspection and must be cross referenced to the current Bridge Inspection Report.

(P) Geometric

This inspection type is used to collect vertical and horizontal roadway clearances for routes both on and under bridges and would also include a complete review and update of all the vertical clearance cards associated with the bridge. An Assistant Inspector can perform as a Team Leader for Geometric Inspections. Geometric data that has been collected using LIDAR can be used to update bridge inventory data as a Geometric Inspection as long as the Team Leader has reviewed the LIDAR data. This inspection type is not reported to the NBI or NTI.

(Q) Feature (Local Agency use only)

This inspection type is used for certified and non-certified inspectors to document time spent in bridge inspection activities. It is also used for scheduling non-reoccurring inspections. When a new UCD is created in BridgeWorks over top of a Feature Inspection, the Feature Inspection report tab will not be perpetuated.

Examples:

- A Co-inspector working on road crew documents bridge rail damage observed while in the area of the bridge.
- One time only chain drag of deck
- Evaluation of bridge for overload permit.

3-3 Bridge Inspection Orientation

Designation of the bridge orientation and a component numbering system for the bridge elements are needed for consistency within the inspection reports. Typical bridge orientation convention has the structure beginning at and going from the west end of the structure to the east, or from the south to the north, or in some cases, the direction of increasing mile post. The subcomponents of a structure are typically numbered from the left to the right looking ahead on stationing. The orientation and component numbering system typically follows the convention of the inspecting agency. If the State inspects bridges for other agencies, they will follow State convention (see Exhibit 3-7 through Exhibit 3-10) or follow established agency orientation.

Exhibit 3-7 Title

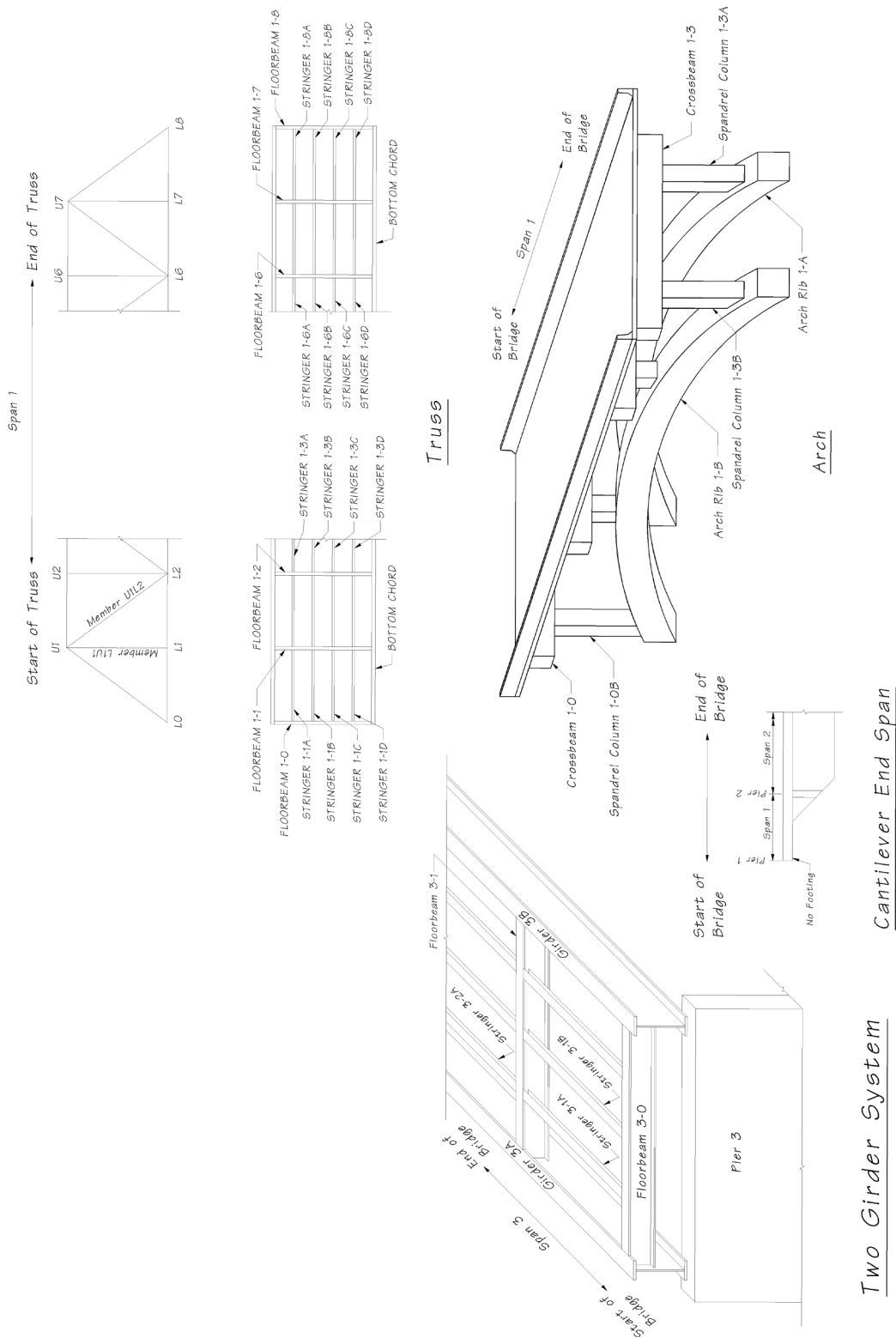
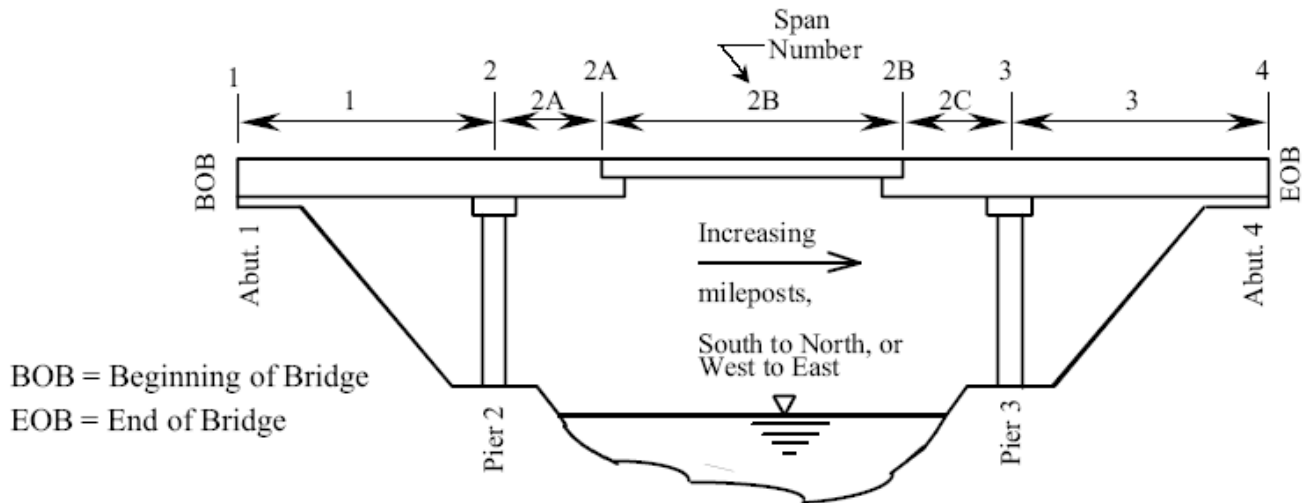


Exhibit 3-8 Component Location**Orientation:**

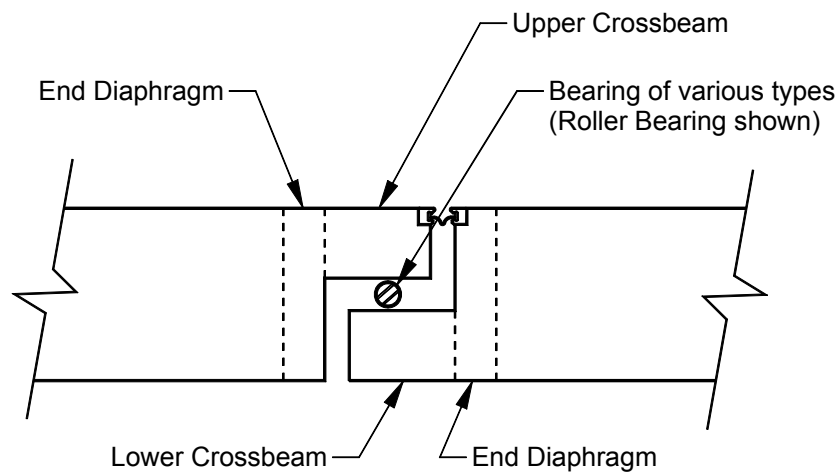
B.O.B. normally south or west ends following route orientation.

Exceptions Include:

One way ramps – B.O.B. = First end to receive traffic.

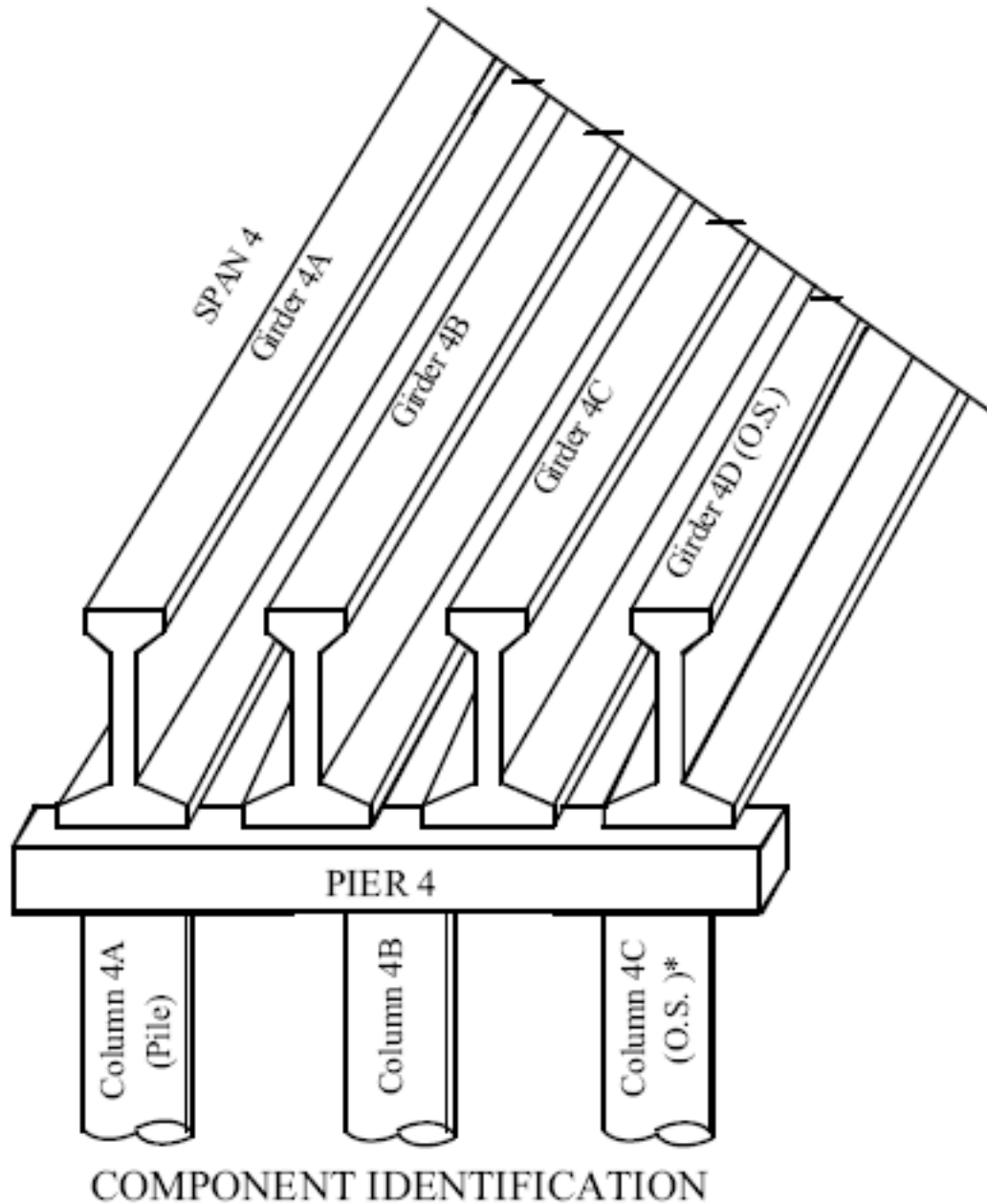
Selected bridges that follow plan orientation.

There is no golden rule about orientation except that B.O.B. Must always be identified in the 'O' note along with basis for this assumption. It is helpful to refer to geographical markers (streets, rivers, etc) when describing the B.O.B.

Exhibit 3-9 In-Span Hinge Callout**IN-SPAN HINGE CALLOUT**

(Do not Quantify Crossbeams in BMS for Box Girder)

Exhibit 3-10 Component Identification



PRIMARY ELEMENTS
Looking Ahead on Mileposts
South to North or West to East

Section 3-4 provides guidelines for inspection processes and procedures specific to the State and the Office of Local Programs. These guidelines can be used as a reference or can be implemented.

3-4 Policy and Procedures

This section discusses the specific policies and procedures that are utilized in BPO or LP that are supplementary guidelines for field work and inspection report writing. These best management practices are utilized by inspection teams and are specific to each program.

3-4.1 BPO Policy and Procedures

3-4.1.A General Inspection and Report Writing

- Columns on the first page of the BIR contain NBI and agency specific items with associated coding information for each structure within the inventory. The numbers within parenthesis next to these item titles are WSBIS item numbers and are unique to the BridgeWorks program that corresponds to FHWA items and/or agency specific items. For example, the first code at the top of the BIR form is the Structural Adequacy Appraisal code and is denoted by WSBIS item number (1657).
- When circumstances (including obstruction of bridge elements) prevent any required work from being completed at the time of inspection, report this fact to your supervisor so a determination can be made whether or not the bridge needs to be rescheduled in the current inspection year. It is the responsibility of the Team Leader to ensure that the bridge inspection is completed unless the supervisor delegates the responsibility. Bridges that cannot be inspected due to high water will be rescheduled in the current inspection year during lower flows. Bridges that need cleaning or vegetation removed will require coordination with maintenance for dirt and/or vegetation removal prior to re-inspection. If the supervisor determines that the bridge does not need to be rescheduled in the current inspection year, clearly identify why the work wasn't completed and what is required of the next team leader to achieve the task.
- Traffic lanes on a structure are numbered from right to left looking in the direction of traffic on one-way multilane routes. For reversible lanes assumed orientation should be described in the report.
- Whenever an in-span hinge separates two bridges, the bearings, restrainers, and joint are to be coded with the "dependent" structure. Explain any exceptions to this rule in the 0 note.
- Whenever measurements are taken, for joint openings, monitored conditions, or anything else, include in the report the date and the air temperature when the measurements were taken. Unless there is a warranted condition, only measurements from the last three inspections need to be maintained.
- Refer to specific joints by pier or span numbers instead of joint numbers. There may be unique circumstances where using joint numbers are justified. Under these circumstances, justification for using joint numbers must be documented in the report.
- Investigate fully and report any and all joint noises and their origination.
- Compare Curb to Curb Deck Width (1356) with Horizontal Clearance (1491 and 1495) and investigate differences (typically they should be the same, except for non-mountable medians).
- Detailed notes are to be entered separately under each Bridge Management System (BMS) element. NBI notes should reference the appropriate BMS element note. Maintain any details of flagged defects or damage within the BMS element note.

- Inspection report summary comments are required for any BMS element in Condition State (CS) 2, 3 or 4.
- Avoid using phrases for significant defects such as “open crack” without a further description such as width, and any repetitive nature. Mark the specific defect location on the bridge with any measurement and the date. Consider taking a photo of the marked defect to include in the inspection report. For concrete crack size guidelines, see the table in Section 4-4.
- When submitting reports for initial review, include field notes in the review package along with a clean copy of the report, the WSBIS sheet, the inspection photographs, and other relevant reports (fracture critical, soundings, etc.). The WSBIS sheet is required to reflect all current changes associated with the inspection.
- Describe photos with respect to bridge orientation, not geographic direction. Photos should identify the orientation, location, and what is photographed. All photos, except deck and elevation photos, must be numbered and referenced in the notes or in an attached file such as a Fracture Critical Report.
- Photos no longer relevant to the report should be deleted. Keep repair photos in the report for an additional inspection cycle so the Bridge Preservation Supervisor can compare them.
- Deck and Elevation Photos should be assessed at each inspection. Update photos if there are new conditions or changes to the structure.

3-4.1.B Bridge Inspection Notes Standard Practice

- Cardinal directions (north, south, east, and west) are never capitalized, except at the beginning of a sentence. These directions are also not abbreviated. The directions northeast, southeast, northwest, and southwest may be abbreviated NE, SE, NW, and SW.
- For acronyms, follow the standard practice of spelling out the first time use with the acronym in parenthesis following (e.g., Local Programs (LP)).
- Use of abbreviations should be limited. Common abbreviations:

F	Fahrenheit	A.M.	a.m.
in. or "	inch (inches)	P.M.	p.m.
ft. or '	foot (feet) ' symbol only used when followed by a dimension in inches.	NW NE SW SE	directions
L	length	D	depth
W	width	etc.	etcetera
sq. ft.	square feet or SF	LF	linear feet
psi	pounds per sq. in.	YT	Yellow tagged
psf	pounds per sq. ft.	RT	Red tagged
ACP	asphalt concrete pavement	LMC	latex modified concrete
BST	bituminous surface treatment	HMA	hot mix asphalt
SR	State Route	US	National Highway
I	Interstate	Jan	January, etc.

- D. Limit the use of symbols to ° for degrees and % for percent.
- E. Dimensions are noted with a space or hyphen between feet and inches, and a hyphen between whole inches and fractions of an inch. When combined with other dimensions, a '0' should precede bare fractions of an inch. Measurements greater than 12" may be listed in inches, if appropriate. Decimal inches may also be used. For example:

1' 1-1/16" × 6' 0-7/8"

6" × 14" timber stringers

8" × 14" × 1/2" deep spall

3 ft. wide × 14 ft. long × 2.5 ft. tall bridge corbel

12 ft. (L) × 15' 6" (W) × 3" (D) popout in south face of Pier 2

1' 0-3/4"(l) × 0.125"(w) crack in east face of Girder 2F

42.2" long anchor bolts

3-4.1.C Report Notes Within BridgeWorks

0 Note – Orientation

- Bridge orientation and identification of the pier/span numbering system is always required, stating the basis of orientation such as "increasing mileposts," "ramp direction," or per plans. Any potentially confusing orientation issues or deviations from standards (west to east or south to north) must be clearly identified. Identifiable physical features at beginning or end of bridge may also be used. See Section 3-3 for bridge orientation examples.
- Place any special instructions and information that doesn't fit anywhere else under the 0 note.
- Use the following note for bridges eligible for a 48 month frequency:

Continue to validate the status of this bridge each inspection as a 48-month inspection candidate. Verify condition ratings, load ratings, vertical clearances, ADT, scour codes and that no major maintenance has been completed in the last two years.

1 Note – This note is maintained by the Team Leader and is used for explanatory information regarding bridges that are Fracture Critical and/or require a Special Feature Inspection. Use this note to explain any special features, procedures, areas to be inspected or complicated scheduling. Do not use this note to redundantly repeat resource information or dates that an inspection occurred.

5 Note – Program Management Engineer maintains this note. It contains information regarding scheduled rehabilitation or replacement, and other upcoming program management items.

9 Note – The 9 note is used to create the executive summary for an Underwater Inspection Report.

11 Note – The Load Rating Engineer maintains this field. It is used to explain any load posting placed on a bridge. This note is closely associated with the Revise Rating flag (2688), see Section 3-4.1.E.

3-4.1.D Operating Level Code (1660)

Verify that load posting signs are in place at the bridge and in advance of the bridge. Advance load postings must be placed in advance of the nearest intersecting road, ramp or wide point in the road where a driver can detour or turn around. Verify that load posting signs and advance load posting signs match the posting requirements in Note 11 and write a note within BridgeWorks under Operating Level Code (1660) to that effect. Take a photo of any existing posting signs and advance posting signs. Ensure that (1293) (open or closed) is coded appropriately.

3-4.1.E Revise Rating Flag (2688)

For State owned bridges, any load rating issues should be addressed within the body of the BIR in the (2688) note. Delete any notes that don't have relevance to the existing condition of the bridge.

3-4.1.F Scour Code (1680)

The Scour Engineer maintains the Scour code (1680) field and notes. Any scour comments by the Team Leader should be placed in BMS Element (#361) Scour Flag or Channel Protection (1677), depending upon which is most appropriate.

3-4.1.G Soundings Resource

When preparing for an inspection that requires soundings, print any existing stream profile file to include in your inspection field packet. The Scour Engineer determines which State bridges need stream cross sections (soundings) by placing a "Y" in the Soundings Flag (2693). When this is required as part of the inspection, perform the following:

1. Enter data into the Scour Field Evaluation Form, see Section 3-5.
 - a. If you could not take soundings on the initial inspection trip, plan on getting them on another trip, either by coordinating with another Team Leader or by doing it yourself.
 - b. If there is a reason soundings should be taken at a different time of the year (e.g. low water, low tide, or fish windows), add a resource with an explanation under the Report Types Tab.
2. Save the file under the bridge number (e.g., 5_24S.xls) in the appropriate year "Soundings" folder found on the W drive at W:\Data\Bridge\RegionalInsp\Common\Soundings.
3. Attach the completed form to the appropriate bridge inspection report File Tab, replacing any already existing form and remove the old one.
4. Change the Soundings Flag (2693) from "Y" to "*" for State bridges only.
5. When you return to the office submit an email to the Scour Engineer stating that the soundings have been completed and that the findings are in the soundings folder for his review.
6. The Scour Engineer will email an electronic stream profile file that you will attach to the report Files tab.
 - a. Replace any existing stream profile file with the updated one and remove the old one.
 - b. Print the new stream profile file and include it with your inspection review packet.

3-4.1.H Timber Structures

- Yellow Tagged (YT) members have rot and a shell greater than or equal to 1-½". A YT member requires a Priority 2 repair. The need for Interim Inspections is determined by the lead.
- Red Tagged (RT) members have rot and a shell less than 1-½". A RT member requires a Priority 1 repair. Schedule an Interim Inspection. Determine the extent, location and significance of decay. Provide details for the Load Rating Engineer.

3-4.1.I Culverts

- Structure Length, NBI Length and Maximum Span are determined in accordance with (1340), (2346), and (1348).
- The BMS quantity is determined by measuring from inlet to outlet of one barrel/pipe and is not dependent upon the number of barrels or pipes.

3-4.1.J Vertical Clearances (1370 and 1374)

Every Routine, Short Span, Safety or Condition inspection shall include verification of the vertical clearance (VC) card comparing it with the current condition and any significant changes (new asphalt, additional lanes, new curb/gutter, etc). Verification will also include at least one vertical clearance measurement if traffic allows, and ideally at the low point if possible. If changes in conditions or conflicts with the VC card are identified, note discrepancies and collect all new clearances if possible. If no changes or discrepancies are identified, no further action is required.

For structures in excess of 16'-6", with no other noted changes or discrepancies, the verification of a vertical clearance measurement is optional.

Each Inspection,

- Check for all postings on bridge, and in advance, are in place.
- Check that Posted clearances are consistent with existing conditions and documentation.
- Update 2694 as applicable
- Update the WSBIS as applicable.

When to Collect or Verify Vertical Clearances

- Whenever a clearance card is missing, incomplete or inaccurate. High traffic volumes may prevent the ability to acquire this information without traffic control.
- When changes in alignments, geometry or conditions affecting current measurements are identified.
- At bridges where the clearances box has been populated with a "V".
- When Team Leader feels that over height hit damage is occurring significantly enough to check the existing clearance information.
- As a part of over height load damage inspections.

Where to Collect or Verify Vertical Clearances

- Minimum clearances along all lane stripes, edges of pavement/curb or controlling grade breaks between these points.
- Appurtenances (lights, signs, utilities) that control minimum vertical clearances should be documented as well, but in most circumstances will be used only to create a repair recommendation to relocate appurtenance. Provide vertical clearance information to the Sign Bridge Engineer.
- For existing postings verify lowest accessible clearance location first and verify other locations as required.
- For Damage Inspections, measure all accessible lane stripe locations in the area of the damage and at the point of impact.

Documenting Vertical Clearances

- Document all measured clearances. Drawings should be neatly transcribed and turned in to the Bridge Geometry Engineer. Photos are to be placed in the Photos/2694 Clearance folder in BridgeWorks.
- 2694 Note should reference: Vertical clearances taken or checked on (date). Minimum clearance below the bridge measured to be (measured minimum clearance) below (exact location). See photo #. REPAIR #00000. **In situations where multiple structures are controlled by one structure that requires posting, the recommended posting locations and the presence or omission of signage shall be appropriately documented in the 2694 notes of each of the involved structures.**
- Update WSBS fields (1370), (1374) and (1499). Appurtenances are not coded. Consult with the Bridge Geometry Engineer for questions.

Posting Requirements and Recommendations

- Bridges with field measured minimum clearances over the traveled lanes equal to 14' 3" up to and including 15' 3" require posting on the structure at the controlling location and advance warning signs at one or both shoulders.
- All bridges with field measured minimum clearances less than 14' 3" require additional advance posting signs in advance of nearest intersecting roads, ramps or a wide point in the road where a driver can detour or turn around.
- All posted clearances shall be 3" less than the actual lowest measured clearance, except as follows:
 1. In some cases, WSDOT intentionally posts clearances with more than a 3" buffer. This decision will be documented in the 2694 note, identifying the posting clearance required.
 2. The City of Spokane has a 1" buffer rule, so bridges are intentionally posted only 1" less than measured. This will be documented in the 2694 note for all affected bridges inspected by BPO staff.
 3. **A bridge posting is allowed when it is 4" less than measured.**

There are situations where bridges should be posted for minimum vertical clearances in the shoulders (outside traveled way). Check with the Bridge Geometry Engineer for details. Appurtenances such as lights or signs that suspend below those bridge elements are to be noted. Those that are 15'3" or less within a traveled path or have evidence of traffic impact damage are to be written up as a repair to be removed or relocated.

Vertical Clearance (V) Repair

- A Priority 1 or 2 Vertical Clearance (V) Repair is warranted as follows:
- Priority 1: When vertical clearance posting is found deficient (for example less than 3" buffer), missing, or where the signage on and in advance of the bridge do not match.
- Priority 2: When a vertical clearance posting on and in advance of the bridge is found conservative (more than 4" buffer) without prior documentation from the Region or other authorized authority.
- Each repair written should identify and include the following language:
- (Minimum clearance measured to be (measured clearance) located at (controlling location) on (date measured). Post for (3" less than measured clearance) in accordance with the most current WSDOT Low Vertical Clearance Signing Policy. Contact Bridge Geometry Engineer at Bridge Preservation 360-570-2544 with any questions.

3-4.1.K Horizontal Clearances

- Collect minimum shoulder widths on both sides of roadway and edge of traveled way (fog line) to permanent obstruction (columns, abutments, retaining walls, toe of slopes). See Item 1379 for ramps, gores and other more complex configuration examples.
- Collect horizontal clearances where the clearance flag has been populated with an "H".
- Update WSBS fields (1379) and (1383) (Minimum Lateral under Clearance Right & Left).

3-4.1.L Inspection of Structures Under Contract

- Information organized by the Bridge Inventory Technician will include the Project Office contact and contract numbers.
- For structures under contract, the BPO inspector MUST make contact with the Project Office (Project Engineer if possible) prior to performing inspection. Do not directly talk to contractor.
- If construction defects or safety issues are found during inspection:
Emergency contacts: 1st – Region Project Engineer
2nd – BPO
3rd – HQ Bridge Construction Office
- Routine Maintenance, contact the Project Office and Regional Maintenance Staff.

3-4.1.M Bridge Scour for Local Agency Bridge Inspections

- Bridges with Scour Code (1680) of 2 and 3 are scour critical. For reports with a scour code of "6","U" or "T" the bridge is assumed to be scour critical.
- Bridges with a scour code of "6", "U", or "T" need a priority 1 repair called out in the (1680) note.

The call out in the (1680) note should read as follows: "This inspection report assumes the bridge is scour critical. REPAIR #XXXXXX"

The Repair should read as follows: "(1680) is coded ["U", "T", or "6"] indicating that the bridge foundation is not known, is tidal, and/or has not been evaluated. Perform evaluation of scour potential and any required mitigation. Indicate determination and any requirements under the (1680) note."

- Scour critical bridges, and those that are assumed to be scour critical, that have exposed footings or have a history of exposed footings due to scour, REQUIRE a priority 1 scour repair documented in the BMS Element (#361) – Scour flag note in BridgeWorks. This repair should read as follows: “Scour mitigation needs to be evaluated.”
- All scour critical bridges need soundings at every Routine Inspection. The (2693) note needs the following comment: “Take soundings every Routine Inspection on this scour critical bridge.” Also ensure that the (2693) flag is set to “Y” at all times. This will help the process stay in place over time.
- Bridges that are not scour critical do not need cross sections unless there is some specific need that is documented in the report.

3-4.1.N Rental Equipment

The Enterprise and Risk Management Office has declared that equipment damage insurance must be purchased when renting access equipment. If the rental company does not offer insurance, insurance can be purchased through the Department of Enterprise Services (DES). The DES insurance option can take up to two weeks to process so plan accordingly.

For rented access equipment the following is required:

- Review the paperwork, when receiving the equipment, to insure that it reflects insurance for the rented equipment.
- Review the invoice when you receive it from the BPO Accountant, making sure that the rate and time used are correct.
- Notify the rental office of any discrepancies found.
- Write the bridge number and dates used on the invoice.
- Return it to the BPO Accountant for processing.

3-4.1.O Bridge Inspection Safety

See Pre-Activity Safety Plan (PASP) for details. See Section 3-5.

3-4.1.P Identifying The Purpose Of Inspections in the Bridge Inspection Report

Indicate the purpose and schedule of any Interim or Special Inspections that are required, similar to the following format: “Interim Inspections of RT timber are done in odd numbered years and Routine Inspections of the entire bridge are done in even numbered years.” Statement should briefly describe what is to be accomplished during the Interim or Special Feature Inspection. This information is placed in the “Notes” box under the specific inspection tab, but may sometimes be more completely explained here. It can additionally be placed in the 0 note.

3-4.1.Q Agreements Inspections

Team Leader will provide the complete submittal package for each bridge inspected, which includes the signed inspection report, the SI&A sheet, the inventory sheet, all photos and files is given to the Bridge Resource Technician (BRT) who checks them against the scope of work. If there is anything missing, the BRT needs to check with the inspectors and follow up with the Bridge Preservation Accountant (BPA) if there are problems with providing a complete submittal package. The complete submittal package for each bridge is scanned and loaded onto BEIST, and a hardcopy filed in the unofficial letter file in the resource room. The complete submittal packages for each bridge are sent to the agency via USPS to the address in the agreement along with a transmittal letter listing all inspection reports provided. A copy of the transmittal letter is given to the BPA for filing with the invoices and agreements.

3-4.2 LP Policy and Procedures

Local Agency Policy and Procedures are detailed in the *Local Agency Guidelines* (LAG). Electronic copies of the LAG are available on the WSDOT Local Programs website at www.wsdot.wa.gov/localprograms.

Local agencies are encouraged to review the BPO Policies and Procedures in the preceding section and adopt or modify the advice to the benefit of their Bridge Program. Local Agency bridge personnel are encouraged to contact the WSDOT Local Programs personnel for guidance and advice on bridge program questions.

3-5 Forms

This section contains inspection forms typically used by the State. Local agencies have the option of developing their own forms with similar information or utilizing the forms in this section.


Exhibit 3-11	Bridge Inspection Report
Exhibit 3-12	WSBIS Form
Exhibit 3-13	Scour Field Evaluation
Exhibit 3-14	Daily Site Dive Log
Exhibit 3-15	Visual Fracture Critical Inspection Report
Exhibit 3-16	DOT Form 234-030 Prestressed Concrete Damage Drawing Template
Exhibit 3-17	DOT Form 234-048 Girder Elevation Template
Exhibit 3-18	DOT Form 750-001 Fall Protection Plan – Emergency Action Plan
Exhibit 3-19	DOT Form 750-060 Lead Exposure Control Work Plan
Exhibit 3-20	DOT Form 750-090 Respirator Record
Exhibit 3-21	DOT Form 750-094 Confined Space Entry Permit
Exhibit 3-22	Ultrasonic UT Inspection Report
Exhibit 3-23	UT Inspection Schedule
Exhibit 3-24	Pins Summary Sheet
Exhibit 3-25	Pin and Hanger Visual Inspection Report
Exhibit 3-26	Special Features Inspection Report
Exhibit 3-27	Vertical Clearance Card Generic
Exhibit 3-28	Vertical Clearance Card Steel
Exhibit 3-29	Vertical Clearance Card Tunnel
Exhibit 3-30	Pre-Activity Safety Plan (PASP)

Exhibit 3-11 Bridge Inspection Report

BRIDGE INSPECTION REPORT										Page 1 of 1																																															
WO CC WE PD		Status:		Printed On:		Agency:																																																			
BAM <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		CD Guid:		CD Date:		Program Mgr:																																																			
Br. No.		SID		Br. Name																																																					
Carrying				Route On		Mile Post																																																			
Intersecting				Route Under		Mile Post																																																			
Inspector's Signature			Cert #		Cert Exp Date		Co-Inspector's Signature																																																		
<input type="checkbox"/> Structural Eval (1657) <input type="checkbox"/> Deck Geometry (1658) <input type="checkbox"/> Underclearance (1659) <input type="checkbox"/> Alignment (1661) <input type="checkbox"/> Deck Overall (1663) <input type="checkbox"/> Superstructure (1671) <input type="checkbox"/> Substructure (1676) <input type="checkbox"/> Culvert (1678) <input type="checkbox"/> Chan/Protection (1677) <input type="checkbox"/> Pier/Abut/Prot (1679)		<input type="checkbox"/> Operating Tons (1552) <input type="checkbox"/> Op RF (1553) <input type="checkbox"/> Inventory Tons (1555) <input type="checkbox"/> Inv RF (1556) <input type="checkbox"/> Operating Level (1660) <input type="checkbox"/> Open/Closed (1293) <input type="checkbox"/> Waterway (1662) <input type="checkbox"/> Scour (1680) <input type="checkbox"/> Soundings Flag (2693) <input type="checkbox"/> Revise Rating (2688) <input type="checkbox"/> Photos Flag (2691) <input type="checkbox"/> Measure Clnrc (2694)		<input type="checkbox"/> No Utilities (2675) <input type="checkbox"/> Bridge Rails (1684) <input type="checkbox"/> Transition (1685) <input type="checkbox"/> Guardrails (1686) <input type="checkbox"/> Terminals (1687) <input type="checkbox"/> Asphalt Depth (2610) <input type="checkbox"/> Des Curb Ht (2611) <input type="checkbox"/> Bridge Rail Ht (2612) <input type="checkbox"/> Year Built (1332) <input type="checkbox"/> Year Rebuilt (1336)		Inspections Performed: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Freq</th> <th>Hrs</th> <th>Date</th> <th>Rep Type</th> </tr> </thead> <tbody> <tr><td></td><td></td><td></td><td>Routine</td></tr> <tr><td></td><td></td><td></td><td>Fract Crit</td></tr> <tr><td></td><td></td><td></td><td>UW</td></tr> <tr><td></td><td></td><td></td><td>Special</td></tr> <tr><td></td><td></td><td></td><td>Interim</td></tr> <tr><td></td><td></td><td></td><td>UWI</td></tr> <tr><td></td><td></td><td></td><td>Damage</td></tr> <tr><td></td><td></td><td></td><td>Safety</td></tr> <tr><td></td><td></td><td></td><td>Short Span</td></tr> <tr><td></td><td></td><td></td><td>In Depth</td></tr> <tr><td></td><td></td><td></td><td>Geometric</td></tr> </tbody> </table>				Freq	Hrs	Date	Rep Type				Routine				Fract Crit				UW				Special				Interim				UWI				Damage				Safety				Short Span				In Depth				Geometric
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			Special																																																						
			Interim																																																						
			UWI																																																						
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Report Type	Date	Frq	Hrs	Insp	CertNo	Coinsp	Note																																																		

Exhibit 3-12 WSBIS Form

WSBIS Field Inventory Report



**Washington State
Department of Transportation**

Approved
Revised
RFC
AAN
Not Reviewed

1001		2009		2132		1019		1021		2023		1155		1188		1196	
Structure ID		Bridge Number		Bridge Name		Owner		County		City		Location		Latitude		Longitude	

Bridge ID WB71

1200

1200		1201		1202		1203		1204		1205		1206		1207		1208		1209	
Feature Intersected		Facilities Carried		Region		Custodian		Parallel		Temporary									

Facilities WB72

1300

1300		1301		1302		1303		1304		1305		1306		1307		1308		1309	
Year Built		Year Rebuilt		Hwy Class		Service Level		Route Number		Milepost		ADT		Truck %		Lanes On		Maximum Span Length	

Layout WB73

1400

1400		1401		1402		1403		1404		1405		1406		1407		1408		1409	
Main Code		On Under		Hwy Class		Service Level		Route Number		Milepost		ADT		Truck %		Lanes On		Maximum Span Length	

Crossing Route On WB74

1500

1500		1501		1502		1503		1504		1505		1506		1507		1508		1509	
Main Code		On Under		Hwy Class		Service Level		Route Number		Milepost		ADT		Truck %		Lanes On		Maximum Span Length	

Crossing Route Under WB74

1600

1600		1601		1602		1603		1604		1605		1606		1607		1608		1609	
Main Code		On Under		Hwy Class		Service Level		Route Number		Milepost		ADT		Truck %		Lanes On		Maximum Span Length	

Design WB75

1700

1700		1701		1702		1703		1704		1705		1706		1707		1708		1709	
Main Code		On Under		Hwy Class		Service Level		Route Number		Milepost		ADT		Truck %		Lanes On		Maximum Span Length	

Inspection Report Types

1800

1800		1801		1802		1803		1804		1805		1806		1807		1808		1809	
Main Code		On Under		Hwy Class		Service Level		Route Number		Milepost		ADT		Truck %		Lanes On		Maximum Span Length	

Inspection Report Types

1900

1900		1901		1902		1903		1904		1905		1906		1907		1908		1909	
Main Code		On Under		Hwy Class		Service Level		Route Number		Milepost		ADT		Truck %		Lanes On		Maximum Span Length	

Inspection Report Types

2000

2000		2001		2002		2003		2004		2005		2006		2007		2008		2009	
Main Code		On Under		Hwy Class		Service Level		Route Number		Milepost		ADT		Truck %		Lanes On		Maximum Span Length	

Inspection Report Types

2100

2100		2101		2102		2103		2104		2105		2106		2107		2108		2109	
Main Code		On Under		Hwy Class		Service Level		Route Number		Milepost		ADT		Truck %		Lanes On		Maximum Span Length	

Inspection Report Types

2200

2200		2201		2202		2203		2204		2205		2206		2207		2208		2209	
Main Code		On Under		Hwy Class		Service Level		Route Number		Milepost		ADT		Truck %		Lanes On		Maximum Span Length	

Inspection Report Types

2300

2300		2301		2302		2303		2304		2305		2306		2307		2308		2309	
Main Code		On Under		Hwy Class		Service Level		Route Number		Milepost		ADT		Truck %		Lanes On		Maximum Span Length	

Inspection Report Types

2400

2400		2401		2402		2403		2404		2405		2406		2407		2408		2409	
Main Code		On Under		Hwy Class		Service Level		Route Number		Milepost		ADT		Truck %		Lanes On		Maximum Span Length	

Inspection Report Types

2500

2500		2501		2502		2503		2504		2505		2506		2507		2508		2509	
Main Code		On Under		Hwy Class		Service Level		Route Number		Milepost		ADT		Truck %		Lanes On		Maximum Span Length	

Inspection Report Types

2600

2600		2601		2602		2603		2604		2605		2606		2607		2608		2609	
Main Code		On Under		Hwy Class		Service Level		Route Number		Milepost		ADT		Truck %		Lanes On		Maximum Span Length	

Inspection Report Types

2700

2700		2701		2702		2703		2704		2705		2706		2707		2708		2709	
Main Code		On Under		Hwy Class		Service Level		Route Number		Milepost		ADT		Truck %		Lanes On		Maximum Span Length	

Inspection Report Types

2800

2800		2801		2802		2803		2804		2805		2806		2807		2808		2809	
Main Code		On Under		Hwy Class		Service Level		Route Number		Milepost		ADT		Truck %		Lanes On		Maximum Span Length	

Inspection Report Types

2900

2900		2901		2902		2903		2904		2905		2906		2907		2908		2909	
Main Code		On Under		Hwy Class		Service Level		Route Number		Milepost		ADT		Truck %		Lanes On		Maximum Span Length	

Inspection Report Types

3000

3000		3001		3002		3003		3004		3005		3006		3007		3008		3009	
Main Code		On Under		Hwy Class		Service Level		Route Number		Milepost		ADT		Truck %		Lanes On		Maximum Span Length	

Inspection Report Types

3100

3100		3101		3102		3103		3104		3105		3106		3107		3108		3109	
Main Code		On Under		Hwy Class		Service Level		Route Number		Milepost		ADT		Truck %		Lanes On		Maximum Span Length	

Inspection Report Types

3200

3200		3201		3202		3203		3204		3205		3206		3207		3208		3209	
Main Code		On Under		Hwy Class		Service Level		Route Number		Milepost		ADT		Truck %		Lanes On		Maximum Span Length	

Inspection Report Types

3300

3300		3301		3302		3303		3304		3305		3306		3307		3308		3309	
Main Code		On Under		Hwy Class		Service Level		Route Number		Milepost		ADT		Truck %		Lanes On		Maximum Span Length	

Inspection Report Types

3400

3400		3401		3402		3403		3404		3405		3406		3407		3408		3409	
Main Code		On Under		Hwy Class		Service Level		Route Number		Milepost		ADT		Truck %		Lanes On		Maximum Span Length	

Inspection Report Types

3500

3500		3501		3502		3503		3504		3505		3506		3507		3508		3509	
Main Code		On Under		Hwy Class		Service Level		Route Number		Milepost		ADT		Truck %		Lanes On		Maximum Span Length	

Inspection Report Types

3600

3600		3601		3602		3603		3604		3605		3606		3607		3608		3609	
Main Code		On Under		Hwy Class		Service Level		Route Number		Milepost		ADT		Truck %		Lanes On		Maximum Span Length	

Inspection Report Types

3700

3700		3701	
------	--	------	--

Exhibit 3-13 Scour Field Evaluation



**Washington State
Department of Transportation**

Scour Field Evaluation

Bridge Number	Bridge Name	Structure ID
Date	Lead Inspector	Co-Inspector

<input type="checkbox"/> Heavy Growth Along Banks <input type="checkbox"/> Ice/Debris in Channel <input type="checkbox"/> Channel/Embankments are Eroding/Sloughing <input type="checkbox"/> Damage to Riprap/Abutments/Piers <input type="checkbox"/> Scour Holes Near Piers/Abutments <input type="checkbox"/> Riprap in Place at Piers/Abutments	<input type="checkbox"/> Boat Required <input type="checkbox"/> Divers Required <input type="checkbox"/> UBIT Required <input type="checkbox"/> Winter Inspection <input type="checkbox"/> Repair Required <input type="checkbox"/> Monitoring Required
--	--

Soundings (Taken from top of the upstream bridge rail)		Thalweg (ft):	
Location	Measurement (ft)	Distance to thalweg (ft):	
		Distance was measured from:	
		Rail Height from Deck (ft):	
		Inspector's Remarks:	

Exhibit 3-14 Daily Site Dive Log



**Washington State
Department of Transportation**

Daily Site Dive Log

Inspector	Generic WSDOT UBITOperator		Date	1/1/2001
Bridge No.	00000000	Bridge Name	XGOCOUGS	
Bridge Type		Waterway Name		
Dive Objective				

Diving Operation

Type of Operation ☐ SCUBA ☐ Snorkel ☐ ROV ☐ Other _____

Equipment

Suit

Air Supply

Site Access

Inspection Tools

Conditions

Water	<input type="checkbox"/> Salt	<input type="checkbox"/> Fresh	<input type="checkbox"/> Brackish	Temperature	_____ °F	Visibility	_____ ft
Surface	<input type="checkbox"/> Calm	<input type="checkbox"/> Choppy	<input type="checkbox"/> Rough				
Surf	<input type="checkbox"/> Small	<input type="checkbox"/> Medium	<input type="checkbox"/> Large	<input type="checkbox"/> N/A			
Tide	<input type="checkbox"/> High	<input type="checkbox"/> Low	<input type="checkbox"/> Flood	<input type="checkbox"/> Ebb	<input type="checkbox"/> N/A		
Current	<input type="checkbox"/> Fast	<input type="checkbox"/> Moderate	<input type="checkbox"/> Slow	Velocity	_____ ft/sec		
Weather	<input type="checkbox"/> Sunny	<input type="checkbox"/> Cloudy	<input type="checkbox"/> Overcast	<input type="checkbox"/> Rain	Air Temp	_____ °F	
Thermocline	Temperature	_____ °F	Depth	_____ ft			

Diver Checks

<input type="checkbox"/> First Aid Equipment on Site	<input type="checkbox"/> Physical Condition of Diver(s) Checked
<input type="checkbox"/> Communication for EMS	<input type="checkbox"/> Communications for Diver(s) Checked
<input type="checkbox"/> Dive Gear Inspected	<input type="checkbox"/> Team Briefed and Understands Dive Plan
<input type="checkbox"/> Air Source Checked	<input type="checkbox"/> Special Site Hazards Noted
<input type="checkbox"/> Pre-Activity Safety Plan Reviewed	
<input type="checkbox"/> _____	<input type="checkbox"/> _____

Dive Plan and Dive Team Procedures

Assess site conditions and determine type of dive operation. Hold on-site pre-dive safety meeting to discuss and plan dive operation, determine roles and responsibilities, review emergency procedures, and check physical condition of diver(s). Assemble and check dive gear. Check communication for diver(s). After completion of dive, review notes, check condition of diver(s), take soundings and photos as required.

Exhibit 3-15 Visual Fracture Critical Inspection Report
(Page 1 of 2)



**Washington State
Department of Transportation**

**VISUAL FRACTURE CRITICAL
INSPECTION REPORT**

Bridge Name:
Bridge No:
Structure ID:
Structure Type:
Agency:
Milepost:

Date:
Hours:
Inspector ID #:
Lead Inspector Initials:
Co-Inspector Initials:

Lead Inspector Signature: _____

Inspected items:

Co-Inspector Signature: _____

Procedures:

FCM Location	FCM Type	FCM Per Girder or Truss Line	Rivet Server Plans		
			Sh. No.	Contract	Sh. Name

Note: FCM = Fracture Critical Member

Exhibit 3-15 Visual Fracture Critical Inspection Report
(Page 2 of 2)



VISUAL FRACTURE CRITICAL INSPECTION REPORT

Bridge Name:
Bridge No.:
Structure ID:
Structure Type:
Agency:
Milepost:

[illegible]

Exhibit 3-16 DOT Form 234-030 Prestressed Concrete Damage Drawing Template

Bridge Number: _____ Inspected By: _____

Bridge Name: _____ Notes: _____

Date: _____

Looking: _____

Location: _____

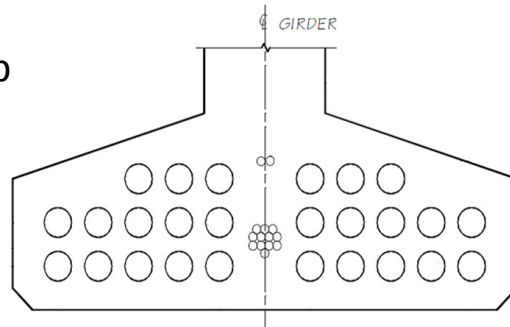
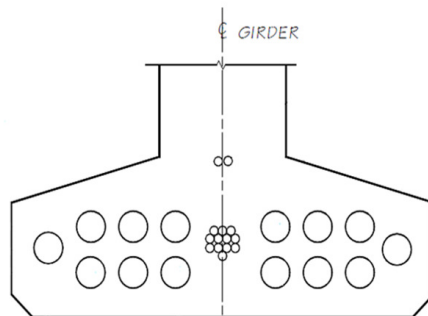
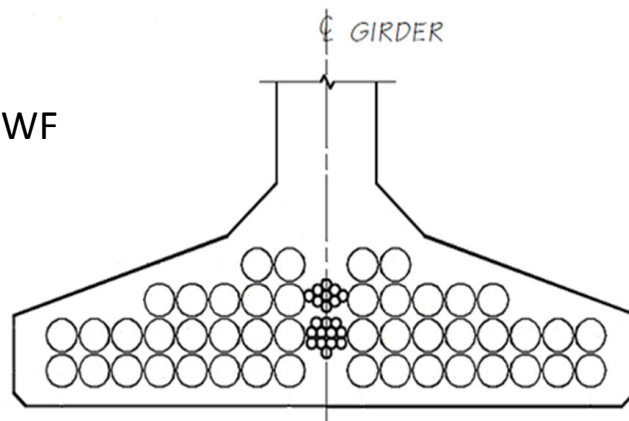

Bulb**W****WF**

Exhibit 3-17 DOT Form 234-048 Girder Elevation Template



**Washington State
Department of Transportation**

Girder Elevation Template

Notes: _____

Bridge Number: _____

Bridge Name: _____

Date: _____

Girder Elevation

Inspected By: _____

Looking: _____

Location: _____

Girder Bottom

Drawings not to scale.

DOT Form 234-048
Revised 10/2015

Exhibit 3-18 DOT Form 750-001 Fall Protection Plan – Emergency Action Plan
(Page 1 of 2)



**Washington State
Department of Transportation**

Fall Protection Plan

Date	Location	Supervisor																					
Description of Work																							
Recognized Fall Hazards 10' or more above ground or lower level (check all that apply) <table style="width: 100%; border: none;"> <tr> <td><input type="checkbox"/> Catwalks</td> <td><input type="checkbox"/> Drilling shafts</td> <td><input type="checkbox"/> Open-sided walking/working surface (i.e. roofs, open-sided floors)*</td> </tr> <tr> <td><input type="checkbox"/> Sloped access</td> <td><input type="checkbox"/> Work decks</td> <td><input type="checkbox"/> Skylight openings</td> </tr> <tr> <td><input type="checkbox"/> Work over water</td> <td><input type="checkbox"/> Floor opening</td> <td><input type="checkbox"/> Surfaces that do not meet the definition of a walking/working surface (i.e. top plate beam)*</td> </tr> <tr> <td><input type="checkbox"/> Welding at height</td> <td><input type="checkbox"/> Wall openings</td> <td><input type="checkbox"/> Overhead hazards (If checked, specify hazards)</td> </tr> <tr> <td><input type="checkbox"/> Set girders</td> <td><input type="checkbox"/> Open-sided ramps</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Leading edge</td> <td></td> <td></td> </tr> <tr> <td><input type="checkbox"/> Bridge deck</td> <td></td> <td></td> </tr> </table> <p>* Walking/working surface = any area whose dimensions are 45 inches or greater in all direction, through which workers pass or conduct work.</p>			<input type="checkbox"/> Catwalks	<input type="checkbox"/> Drilling shafts	<input type="checkbox"/> Open-sided walking/working surface (i.e. roofs, open-sided floors)*	<input type="checkbox"/> Sloped access	<input type="checkbox"/> Work decks	<input type="checkbox"/> Skylight openings	<input type="checkbox"/> Work over water	<input type="checkbox"/> Floor opening	<input type="checkbox"/> Surfaces that do not meet the definition of a walking/working surface (i.e. top plate beam)*	<input type="checkbox"/> Welding at height	<input type="checkbox"/> Wall openings	<input type="checkbox"/> Overhead hazards (If checked, specify hazards)	<input type="checkbox"/> Set girders	<input type="checkbox"/> Open-sided ramps		<input type="checkbox"/> Leading edge			<input type="checkbox"/> Bridge deck		
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<input type="checkbox"/> Set girders	<input type="checkbox"/> Open-sided ramps																						
<input type="checkbox"/> Leading edge																							
<input type="checkbox"/> Bridge deck																							
Other Recognized Hazards Environmental <input type="checkbox"/> Sun <input type="checkbox"/> Rain <input type="checkbox"/> Snow <input type="checkbox"/> Heat/Ice <input type="checkbox"/> Cold <input type="checkbox"/> Noise <input type="checkbox"/> Darkness Live hazards <input type="checkbox"/> Birds <input type="checkbox"/> Insects <input type="checkbox"/> Reptiles <input type="checkbox"/> Human <input type="checkbox"/> Other																							
Method of Fall Protection to be Used (check all that apply) <table style="width: 100%; border: none;"> <tr> <td><input type="checkbox"/> Guardrail system</td> <td><input type="checkbox"/> Personal fall arrest system</td> <td><input type="checkbox"/> Vertical life lines and rope grab</td> </tr> <tr> <td><input type="checkbox"/> Warning line (LSO)**</td> <td><input type="checkbox"/> Personal fall restraint system</td> <td><input type="checkbox"/> Appropriate anchors for system used</td> </tr> <tr> <td><input type="checkbox"/> Warn line w/ safety monitor (LSO)**</td> <td><input type="checkbox"/> Positioning device system</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Catch platform</td> <td><input type="checkbox"/> Covers (floor holes and openings)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Safety net</td> <td><input type="checkbox"/> Horizontal life lines</td> <td></td> </tr> </table> <p>* Warn line other than (LSO) shall be erected not less than fifteen feet from unprotected sides of edges of the open side surface ** LSO = (low slopes only 4:12 or less)</p>			<input type="checkbox"/> Guardrail system	<input type="checkbox"/> Personal fall arrest system	<input type="checkbox"/> Vertical life lines and rope grab	<input type="checkbox"/> Warning line (LSO)**	<input type="checkbox"/> Personal fall restraint system	<input type="checkbox"/> Appropriate anchors for system used	<input type="checkbox"/> Warn line w/ safety monitor (LSO)**	<input type="checkbox"/> Positioning device system		<input type="checkbox"/> Catch platform	<input type="checkbox"/> Covers (floor holes and openings)		<input type="checkbox"/> Safety net	<input type="checkbox"/> Horizontal life lines							
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<input type="checkbox"/> Warn line w/ safety monitor (LSO)**	<input type="checkbox"/> Positioning device system																						
<input type="checkbox"/> Catch platform	<input type="checkbox"/> Covers (floor holes and openings)																						
<input type="checkbox"/> Safety net	<input type="checkbox"/> Horizontal life lines																						
Other Standards that Apply <input type="checkbox"/> Boom lift <input type="checkbox"/> Scaffold w/ guardrail <input type="checkbox"/> Aerial lift <input type="checkbox"/> Excavation/Trenching <input type="checkbox"/> Scissor lift <input type="checkbox"/> Ladders <input type="checkbox"/> Forklift																							
Personal Protection Equipment (PPE) to be used at the worksite <input type="checkbox"/> Hard hat <input type="checkbox"/> Rain Gear <input type="checkbox"/> Gloves <input type="checkbox"/> Work boot <input type="checkbox"/> Safety eyewear <input type="checkbox"/> Face protection <input type="checkbox"/> Protective clothing Securing tools <input type="checkbox"/> Tool belts <input type="checkbox"/> Tool bucket <input type="checkbox"/> Toe boards <input type="checkbox"/> Other																							
Procedure for Assembly, Maintenance, Inspection, and Disassembly of System Assembly, disassembly, and maintenance of all equipment will be done according to manufacturer's recommended procedures. A visual inspection of all safety equipment will be done daily or before each use. Any defective equipment will be tagged and removed from service immediately. <div style="border: 1px solid black; height: 50px; width: 100%; margin-top: 10px;"></div>																							

DOT Form 750-001
Revised 10/2013

A Copy of This Work Plan Must Be On Job Site

Exhibit 3-18 DOT Form 750-001 Fall Protection Plan – Emergency Action Plan
(Page 2 of 2)

Emergency Action Plan		
First Aid / CPR		
Names of Trained Personnel on Site		
Location of First Aid Equipment		
Emergency Services (call or radio 911 if available)		
Location of Phone	Phone Number of Sheriff or Police	Phone No. of Emergency Resp. Team
Describe Procedure for Removal of Injured Employee (Note: No removal will be attempted without supervision of qualified emergency rescue personnel)		
Crane <input type="radio"/> Yes <input type="radio"/> No	Location	
Hoist <input type="radio"/> Yes <input type="radio"/> No	Location	
Winch <input type="radio"/> Yes <input type="radio"/> No	Location	
Block / Tackle <input type="radio"/> Yes <input type="radio"/> No	Location	
Other (Describe)		
Verification of Compliance		
Employee Signature	Employee Signature	
Employee Signature	Employee Signature	

DOT Form 750-001
Revised 10/2013

A Copy of This Work Plan Must Be On Job Site

Exhibit 3-19 DOT Form 750-060 Lead Exposure Control Work Plan
(Page 1 of 2)

Washington State Department of Transportation		Lead Exposure Control Work Plan	
Date	Project Location	*Supervisor/Competent Person	No. of People on Crew
Description of Work (e.g. equipment used, materials involved, special procedures/practices, responsibilities)			
<p>*Supervisor/Competent Person means one who is capable of identifying existing and predictable lead hazards in the surrounding or working conditions and who has authorization to take prompt corrective measures to eliminate them.</p>			
When lead is present if doing these "trigger tasks" (check all that apply)	Treat as if exposed at this level ¹	Use appropriate respiratory protection ² for exposure level (check protection used)	Methods to Reduce/Control Lead Exposure (check all that apply) ³
<input type="checkbox"/> Torch burning <input type="checkbox"/> Cutting <input type="checkbox"/> Welding <input type="checkbox"/> Abrasive blasting <input type="checkbox"/> Rivet busting <input type="checkbox"/> Lead burning <input type="checkbox"/> Power tool cleaning without dust collection systems <input type="checkbox"/> Using lead containing mortar <input type="checkbox"/> Abrasive blasting enclosure movement and removal <input type="checkbox"/> Manual demolition of structures <input type="checkbox"/> Manual scraping <input type="checkbox"/> Manual sanding <input type="checkbox"/> Heat gun applications <input type="checkbox"/> Power tools cleaning with dust collection systems <input type="checkbox"/> Spray painting with lead paint.	 ≥2,500 µg/m ³ (50 times the PEL or more) ≥500 µg/m ³ (10 times the PEL or more)	<input type="checkbox"/> Full-face PAPR (tight fitting) <input type="checkbox"/> Hood or helmet PAPR with manufacturer confirmed APF of 1000 <input type="checkbox"/> Full-face airline respirator in continuous flow or positive pressure mode <input type="checkbox"/> Any of the respirators listed above <input type="checkbox"/> Full-face respirator <input type="checkbox"/> Hood or helmet PAPR <input type="checkbox"/> Half-face airline respirator in continuous flow or positive pressure mode <input type="checkbox"/> Any of the respirators listed above <input type="checkbox"/> Half-face respirator	<input type="checkbox"/> Prior removal with tool equipped with dust control <input type="checkbox"/> Ventilation (mechanical) <input type="checkbox"/> Employee rotation to distribute lead exposed work <input type="checkbox"/> Dust suppression/wet methods <input type="checkbox"/> Prior removal with chemical stripper <input type="checkbox"/> Encapsulation <input type="checkbox"/> Other, describe:
<input type="checkbox"/> Inspections <input type="checkbox"/> Any item not listed	Contact your safety office for guidance prior to job	Contact the safety office prior to job	
<p>¹ If you have recent air monitoring on a similar job (e.g. tasks, equipment, environmental conditions, paint lead content), you can use that to determine exposure.</p> <p>² Other appropriate options may be available. Contact your safety office for more information. APF = assigned protection factor (see WAC 296-842-13005)</p>			

DOT Form 750-060
Revised 05/2013

Exhibit 3-19 DOT Form 750-060 Lead Exposure Control Work Plan
(Page 2 of 2)

<p>³ All feasible control options must be implemented to reduce exposures below the PEL. If respirators are the only method used to reduce exposures, describe in detail why other controls are not feasible.</p> <p>_____</p> <p>_____</p> <p>_____</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="4" style="background-color: #cccccc; text-align: left; padding: 5px;">Requirements for all lead work</th> </tr> <tr> <td colspan="4" style="padding: 5px;"> <input type="checkbox"/> All employees trained in lead-safe work practices <input type="checkbox"/> Soap, water (drinking water quality), and towels available and used before eating, drinking, smoking, or other "hand to face" activities <div style="display: flex; align-items: center;"> <input type="checkbox"/> on site or <input type="checkbox"/> at facility no further than three minutes away </div> <input type="checkbox"/> Area for lunch and breaks that is free of lead contamination. List location: _____ <input type="checkbox"/> All employees have been offered/had access to initial blood testing <input type="checkbox"/> Other PPE (as applicable) gloves, hardhat, welding gloves, work boots, eye protection/hearing protection <input type="checkbox"/> No eating, drinking, smoking, or other hand to face activities conducted in lead work zone <input type="checkbox"/> Equipment, tools, work surfaces where lead dust may accumulate are cleaned with HEPA vacuum and/or wet cleaning methods at end of shift <input type="checkbox"/> project <input type="checkbox"/> Job will be routinely inspected by Supervisor/Competent person <input type="checkbox"/> Air monitoring has been performed in the last 12 months on similar job or will be treated as "trigger task" exposures levels listed on previous page </td> </tr> <tr> <th colspan="4" style="background-color: #cccccc; text-align: left; padding: 5px;">All items below are also required if exposures are at or above the PEL (50 micrograms per cubic meter of air) or doing trigger tasks with no monitoring within previous 12 months showing exposures are below the PEL</th> </tr> <tr> <td colspan="4" style="padding: 5px;"> <input type="checkbox"/> Coveralls: worn during all lead work, removed or HEPA vacuumed before entering lunch/break area or leaving work site, and removed at end of shift and placed in sealed and labeled bag or other container that will prevent dispersion of dust. Coveralls or other exposed garments must never be taken home. <input type="checkbox"/> Respiratory protection used selected based on either: 1. _____ As required by trigger task level 2. _____ Recent air monitoring: contact the Safety Office to identify applicable air monitoring <input type="checkbox"/> Employees medically cleared for respirator use and fit tested </td> </tr> <tr> <th colspan="4" style="background-color: #cccccc; text-align: left; padding: 5px;">All employees on job site must sign the lead control plan</th> </tr> <tr> <td style="text-align: center; vertical-align: middle;">↑</td> <td style="text-align: center; vertical-align: middle;">↑</td> <td style="text-align: center; vertical-align: middle;">↑</td> <td style="text-align: center; vertical-align: middle;">↑</td> </tr> <tr> <td style="text-align: center; vertical-align: middle;">↑</td> <td style="text-align: center; vertical-align: middle;">↑</td> <td style="text-align: center; vertical-align: middle;">↑</td> <td style="text-align: center; vertical-align: middle;">↑</td> </tr> <tr> <td style="text-align: center; vertical-align: middle;">↑</td> <td style="text-align: center; vertical-align: middle;">↑</td> <td style="text-align: center; vertical-align: middle;">↑</td> <td style="text-align: center; vertical-align: middle;">↑</td> </tr> <tr> <td style="text-align: center; vertical-align: middle;">↑</td> <td style="text-align: center; vertical-align: middle;">↑</td> <td style="text-align: center; vertical-align: middle;">↑</td> <td style="text-align: center; vertical-align: middle;">↑</td> </tr> <tr> <td colspan="2" style="padding: 5px;">Supervisor/Competent Person Printed Name</td> <td colspan="2" style="padding: 5px;">Supervisor/Competent Person Signature</td> </tr> <tr> <td colspan="2" style="padding: 5px;"></td> <td colspan="2" style="padding: 5px;">Date Signed</td> </tr> </table>	Requirements for all lead work				<input type="checkbox"/> All employees trained in lead-safe work practices <input type="checkbox"/> Soap, water (drinking water quality), and towels available and used before eating, drinking, smoking, or other "hand to face" activities <div style="display: flex; align-items: center;"> <input type="checkbox"/> on site or <input type="checkbox"/> at facility no further than three minutes away </div> <input type="checkbox"/> Area for lunch and breaks that is free of lead contamination. List location: _____ <input type="checkbox"/> All employees have been offered/had access to initial blood testing <input type="checkbox"/> Other PPE (as applicable) gloves, hardhat, welding gloves, work boots, eye protection/hearing protection <input type="checkbox"/> No eating, drinking, smoking, or other hand to face activities conducted in lead work zone <input type="checkbox"/> Equipment, tools, work surfaces where lead dust may accumulate are cleaned with HEPA vacuum and/or wet cleaning methods at end of shift <input type="checkbox"/> project <input type="checkbox"/> Job will be routinely inspected by Supervisor/Competent person <input type="checkbox"/> Air monitoring has been performed in the last 12 months on similar job or will be treated as "trigger task" exposures levels listed on previous page				All items below are also required if exposures are at or above the PEL (50 micrograms per cubic meter of air) or doing trigger tasks with no monitoring within previous 12 months showing exposures are below the PEL				<input type="checkbox"/> Coveralls: worn during all lead work, removed or HEPA vacuumed before entering lunch/break area or leaving work site, and removed at end of shift and placed in sealed and labeled bag or other container that will prevent dispersion of dust. Coveralls or other exposed garments must never be taken home. <input type="checkbox"/> Respiratory protection used selected based on either: 1. _____ As required by trigger task level 2. _____ Recent air monitoring: contact the Safety Office to identify applicable air monitoring <input type="checkbox"/> Employees medically cleared for respirator use and fit tested				All employees on job site must sign the lead control plan				↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	Supervisor/Competent Person Printed Name		Supervisor/Competent Person Signature				Date Signed	
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↑	↑	↑	↑																																										
Supervisor/Competent Person Printed Name		Supervisor/Competent Person Signature																																											
		Date Signed																																											

DOT Form 750-060
Revised 05/2013

Exhibit 3-20 DOT Form 750-090 Respirator Record



**Washington State
Department of Transportation**

Respirator Record

Name		Employee ID Number	Organization Code
Supervisor's Name		Telephone Number	
Exposure			
<input type="checkbox"/> Welding/Cutting/Brazing <input type="checkbox"/> Lead <input type="checkbox"/> Solvents <input type="checkbox"/> Pigeon Droppings <input type="checkbox"/> Spray Painting <input type="checkbox"/> Pesticides <input type="checkbox"/> Bridge Maintenance <input type="checkbox"/> Other (Specify) _____ <input type="checkbox"/> Vehicle Body Repair <input type="checkbox"/> Asbestos <input type="checkbox"/> Abrasive Blasting <input type="checkbox"/> Pavement Marking <input type="checkbox"/> Silica <input type="checkbox"/> Grinding/Sanding			
Fit Test			
Date of Fit Test		Type of Fit Test Used <input type="checkbox"/> Qualitative <input type="checkbox"/> Quantitative <input type="checkbox"/> N/A	
Tester		<input type="radio"/> Pass <input type="radio"/> Fail	
Respirator			
Size <input type="checkbox"/> Small <input type="checkbox"/> Medium <input type="checkbox"/> Large Facepiece <input type="checkbox"/> 1/2 Mask <input type="checkbox"/> Full Face <input type="checkbox"/> Hood/Helmet Type <input type="checkbox"/> SCBA <input type="checkbox"/> Chemical Cartridge <input type="checkbox"/> PAPR <input type="checkbox"/> Gas Mask <input type="checkbox"/> Air Line <input type="checkbox"/> Combination <input type="checkbox"/> Dust / Mist <input type="checkbox"/> Other (Describe) _____		Manufacturer <input type="checkbox"/> North <input type="checkbox"/> Northstar <input type="checkbox"/> MSA <input type="checkbox"/> American Optical <input type="checkbox"/> Willson <input type="checkbox"/> Scott <input type="checkbox"/> Survivair <input type="checkbox"/> Glendale <input type="checkbox"/> 3M <input type="checkbox"/> Uvex <input type="checkbox"/> Bullard <input type="checkbox"/> Other _____	
		Model Number	Approval Number
Comments			

DOT Form 750-090
Revised 02/2012

Exhibit 3-21 DOT Form 750-094 Confined Space Entry Permit
(Page 1 of 2)



**Washington State
Department of Transportation**

Confined Space Entry Permit

Location, Description and Classification of Confined Space																																																																																																																	
Date		Purpose of Entry/Work to be done					Time Started																																																																																																										
Division/Unit							Time Completed																																																																																																										
Supervisor(s) in Charge of Crew			Type of Crew			Phone																																																																																																											
Hazards in Confined Space Check all that apply and ensure each hazard is eliminated or controlled before and during entry:																																																																																																																	
<input type="checkbox"/> (Potentially) Hazardous atmosphere <input type="checkbox"/> Trapping or asphyxiation hazard (inwardly covering walls or floor which slopes downwards and tapers to a smaller section) <input type="checkbox"/> Material with potential to engulf <input type="checkbox"/> Any Other hazard that is capable of impairing self rescue or presents immediate danger to life or health (describe): <input type="checkbox"/> Electrical shock <input type="checkbox"/> Moving parts <input type="checkbox"/> Temperature extremes																																																																																																																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;">Requirements Completed (All applicable must be completed before entry)</th> <th style="width: 10%;">Completed</th> <th style="width: 10%;">N/A</th> <th style="width: 70%;">Requirements Completed (All applicable must be completed before entry)</th> <th style="width: 10%;">Completed</th> <th style="width: 10%;">N/A</th> </tr> </thead> <tbody> <tr> <td>Lockout - De-energize</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>First Aid/CPR Equipment & Trained Personnel</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Line(s) Broken, Capped or Blanked</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Communication Equipment</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Purge, Flush, and Vent</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Secure area (post, flag and protect from falling objects)</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Ventilation</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Hot Work Permit</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>Lighting (explosion proof as necessary)</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td colspan="3">Add any other requirements necessary for entry</td> </tr> <tr> <td>Respirator (list type)</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td>Protective Clothing</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td>Standby Safety Personnel</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td>Full Body Harness with "D" Ring</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td>Emergency Escape/Retrieval/Rescue/Equipment</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td>Lifelines</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>										Requirements Completed (All applicable must be completed before entry)	Completed	N/A	Requirements Completed (All applicable must be completed before entry)	Completed	N/A	Lockout - De-energize	<input type="checkbox"/>	<input type="checkbox"/>	First Aid/CPR Equipment & Trained Personnel	<input type="checkbox"/>	<input type="checkbox"/>	Line(s) Broken, Capped or Blanked	<input type="checkbox"/>	<input type="checkbox"/>	Communication Equipment	<input type="checkbox"/>	<input type="checkbox"/>	Purge, Flush, and Vent	<input type="checkbox"/>	<input type="checkbox"/>	Secure area (post, flag and protect from falling objects)	<input type="checkbox"/>	<input type="checkbox"/>	Ventilation	<input type="checkbox"/>	<input type="checkbox"/>	Hot Work Permit	<input type="checkbox"/>	<input type="checkbox"/>	Lighting (explosion proof as necessary)	<input type="checkbox"/>	<input type="checkbox"/>	Add any other requirements necessary for entry			Respirator (list type)	<input type="checkbox"/>	<input type="checkbox"/>				Protective Clothing	<input type="checkbox"/>	<input type="checkbox"/>				Standby Safety Personnel	<input type="checkbox"/>	<input type="checkbox"/>				Full Body Harness with "D" Ring	<input type="checkbox"/>	<input type="checkbox"/>				Emergency Escape/Retrieval/Rescue/Equipment	<input type="checkbox"/>	<input type="checkbox"/>				Lifelines	<input type="checkbox"/>	<input type="checkbox"/>																																			
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Purge, Flush, and Vent	<input type="checkbox"/>	<input type="checkbox"/>	Secure area (post, flag and protect from falling objects)	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																												
Ventilation	<input type="checkbox"/>	<input type="checkbox"/>	Hot Work Permit	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																												
Lighting (explosion proof as necessary)	<input type="checkbox"/>	<input type="checkbox"/>	Add any other requirements necessary for entry																																																																																																														
Respirator (list type)	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																															
Protective Clothing	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																															
Standby Safety Personnel	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																															
Full Body Harness with "D" Ring	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																															
Emergency Escape/Retrieval/Rescue/Equipment	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																															
Lifelines	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																															
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Atmospheric Checks</th> <th rowspan="2">Acceptable Conditions</th> <th rowspan="2">Initial Checks</th> <th rowspan="2">Checks After Isolation and Ventilation</th> <th colspan="8">Periodic Checks</th> </tr> <tr> <th>Hr 1</th> <th>Hr 2</th> <th>Hr 3</th> <th>Hr 4</th> <th>Hr 5</th> <th>Hr 6</th> <th>Hr 7</th> <th>Hr 8</th> </tr> </thead> <tbody> <tr> <td>% of Oxygen</td> <td>19.5% to 23%</td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td>L.E.L.¹</td> <td>≤ 10%</td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td>Carbon Monoxide</td> <td>< 35 ppm</td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td>Hydrogen Sulfide</td> <td>< 10 ppm</td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>										Atmospheric Checks	Acceptable Conditions	Initial Checks	Checks After Isolation and Ventilation	Periodic Checks								Hr 1	Hr 2	Hr 3	Hr 4	Hr 5	Hr 6	Hr 7	Hr 8	% of Oxygen	19.5% to 23%													L.E.L. ¹	≤ 10%													Carbon Monoxide	< 35 ppm													Hydrogen Sulfide	< 10 ppm																																								
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Atmospheric monitoring conducted by:																																																																																																																	
Note: continuous/periodic tests shall be performed throughout the job. Contact Region Safety Office with questions.																																																																																																																	

¹ L.E.L. Lower Explosive Limit, also referred to as lower flammable limit (LFL).

Records must be maintained for at least one year.

Exhibit 3-21 DOT Form 750-094 Confined Space Entry Permit
(Page 2 of 2)

Sampling Equipment	Name	Model/Type	Date Calibrated	Identification Number

Communication procedures between entrants and attendants

Emergency Services

Emergency services must be arranged **prior** to **permit-required** confined space entry (including 911 services). Only persons who have been trained and equipped for entry rescue may enter the space to perform rescue services. Do **not** attempt an entry rescue if you are not trained and equipped to do so. If a person is down for no apparent cause, you must assume that toxic gases or an oxygen deficiency exist.

Emergency/Rescue Service Provided by

Phone Number/Contact Information

Describe Procedures (include necessary equipment):

Print Name	Initial	Authorized Role ²
		<input type="radio"/> Entrant <input type="radio"/> Attendant
		<input type="radio"/> Entrant <input type="radio"/> Attendant
		<input type="radio"/> Entrant <input type="radio"/> Attendant
		<input type="radio"/> Entrant <input type="radio"/> Attendant
		<input type="radio"/> Entrant <input type="radio"/> Attendant
		<input type="radio"/> Entrant <input type="radio"/> Attendant
		<input type="radio"/> Entrant <input type="radio"/> Attendant

² Check the person's authorized role. Remember, a person cannot be both an attendant and entrant; they can only serve one role.

Entry Supervisor Authorization - All Entry Conditions Satisfied	
Signature	Date
Permit expiration date and time (may not be longer than required to perform work)	
Date	Time
Post entry review of permit conducted by	Date

Post entry reviews must be done within one year of entry.

DOT Form 750-094
Revised 08/2011

Distribution: Original to Division/Unit, Copy to Regional Safety Office

Exhibit 3-22 Ultrasonic UT Inspection Report
(Page 1 of 2)



**Washington State
Department of Transportation**

UT INSPECTION REPORT

Bridge Name:
Bridge No:
Structure ID:
Structure Type:
Agency:
Milepost:

Date:
Hours:
Inspector ID #:
Lead Inspector Initials:
Co-Inspector Initials:

Inspected items:

Procedures:

Pins

1. When possible, test from both ends of pins.
2. Verify pin length shown on back reflection with plans. If back reflection does not match the plans, conduct manual length measurement and document correct pin length.
3. Start test with transducer at or near pin center for back reflection check, then run transducer around full perimeter of pin, searching for indications or significant loss of back reflection.
4. Whenever the test suggests that there is a defect in a pin, store and print out the indication with all associated equipment and settings documented. The location of the transducer shall also be documented using a clock hand convention (1 O'clock to 12 O'clock).

UTM Location	UTM Type	UTM Per Girder or Truss Line	Rivet Server Plans		
			Sh. No.	Contract	Sh. Name

Note: UTM = Ultrasonic Tested Member

Exhibit 3-22 Ultrasonic UT Inspection Report
(Page 2 of 2)

<div>LEFT END FACE</div> <div>12:00 3:00 6:00 9:00</div> <div>12:00 3:00 6:00 9:00</div>		<div>PROFILE LOOKING AHEAD ON STATION</div> <div>LOOKING</div> <div>D = in.</div> <div>d = in.</div> <div>S left = in.</div> <div>S right = in.</div> <div>Total Length, L = in.</div>		<div>RIGHT END FACE</div> <div>12:00 3:00 6:00 9:00</div> <div>12:00 3:00 6:00 9:00</div>		<div>H = in.</div> <div>h = in.</div> <div>STRUCTURE I.D.</div> <div>TRUSS or GIRDER</div> <div>PIN I.D.</div>	
DATE		DATE		DATE		DATE	
COMMENTS:		COMMENTS:		COMMENTS:		COMMENTS:	

Exhibit 3-23 UT Inspection Schedule

Washington State Department of Transportation

UT INSPECTION SCHEDULE

Bridge Name:

Bridge No.:

Structure ID:

Structure Type:

Agency:

Milepost:

Date:

Hours:

Inspector ID #:

Lead Inspector:

Co-Inspector:

Truss / Girder	Span	Location	Detail Description	Redundant	Condition State		Freq. (Months)	UT Inspection Date	Next Inspection Date
					VT	UT			

UT Inspection Schedule.xlsx

1 of 1

Exhibit 3-24 Pins Summary Sheet



**Washington State
Department of Transportation**

PINS SUMMARY SHEET

Bridge Name:
Bridge No.:
Structure ID:
Structure Type:
Agency:
Milepost:
Date:
Hours:
Inspector ID #:
Lead Inspector:
Co-Inspector:

[illegible]

Pins Summary Sheet.xlsx

1 of 1

Exhibit 3-25 Pin and Hanger Visual Inspection Report
(Page 1 of 2)



**Washington State
Department of Transportation**

**PIN AND HANGER VISUAL
INSPECTION REPORT**

Bridge Name:
Bridge No:
Structure ID:
Structure Type:
Agency:
Milepost:

Date:
Hours:
Inspector ID #:
Lead Inspector Initials:
Co-Inspector Initials:

Lead Inspector Signature: _____

Inspected Items: Pins & Hanger Assemblies

Co-Inspector Signature: _____

Procedures:

Hangers

1. As required, use mirrors or other equipment to check inside surfaces of members.
2. Check for loose or unevenly loaded member sub-elements.
3. Check all rivets at connection plates, with emphasis on first row. The first row is the row closest to the edge of the connection or gusset plate.
4. Check for any welds, including plug, tack, or repair welds. Record location of welds, regardless of condition, and document weld type and category.
5. Check members and associated connection or gusset plates for areas of heavy or pitted corrosion, nicks, gouges, sharp bends, and collision damage. Record location of all these conditions and estimated section loss, if applicable.
6. Check all heat straightened or repaired areas. Record location of these areas, regardless of condition.

Pins and Anchor Bolts

1. As required, use mirrors or other equipment to check inside surfaces of members.
2. Check for pitting, laminar rust, surface deformation, and pack rust. It is important to check the pin, pin nuts, and all members surrounding the pin for this kind of steel deterioration.
3. Check for mobility and noise of pin and surrounding members. If the pin is physically "frozen" it is important to note this because the added stress can affect other members in the structure.
4. Observe and record abnormalities like; alignment, pin wear, loose pin nuts, and amount of nut engagement. It's important to note that full nut engagement is when the nut is flush with the pin or the pin is extending past the nut.
5. Check for paint system failure on pin nuts, pin, and surrounding members.

Location	Type	Member Per Girder or Truss Line	Rivet Server Plans		
			Sh. No.	Contract	Sh. Name

Exhibit 3-25 Pin and Hanger Visual Inspection Report
(Page 2 of 2)



**PIN AND HANGER VISUAL
INSPECTION REPORT**

Bridge Name:
Bridge No.:
Structure ID:
Structure Type:
Agency:
Milepost:

Date:
Hours:
Inspector ID #:
Lead Inspector:
Co-Inspector:

Truss / Girder	Span	Location	Feature Inspected	Detail Description	Remarks
Pins					
Hangers					

Exhibit 3-26 Special Features Inspection Report
(Page 1 of 2)



**Washington State
Department of Transportation**

**SPECIAL FEATURES
INSPECTION REPORT**

Bridge Name:
Bridge No:
Structure ID:
Structure Type:
Agency:
Milepost:

Date:
Hours:
Inspector ID #:
Lead Inspector Initials:
Co-Inspector Initials:

Lead Inspector Signature: _____

Inspected items:

Co-Inspector Signature: _____


Procedures:

--

Special Features	Specail Features Type	FCM Per Girder or Truss Line	Rivet Server Plans		
			Sh. No.	Contract	Sh. Name

Note: FCM = Fracture Critical Member

Exhibit 3-26 Special Features Inspection Report
(Page 2 of 2)



SPECIAL FEATURES
INSPECTION REPORT

Bridge Name:

Bridge No.:

Structure ID:

Structure Type:

Agency:

Milepost:

Date:

Hours:

Inspector ID #:

Lead Inspector:

Co-Inspector:

Girder	Pier	Location	Feature Inspected	Detail Description	Remarks

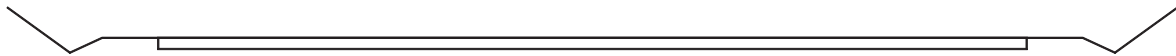
2 of 2

Exhibit 3-27 Vertical Clearance Card Generic

Bridge Number:	
Structure ID:	
Looking:	
Measurement Date:	
Photo Date:	
Inspection/Co Initials:	
Minimum Vertical Clearance Posted For:	
Posting on Structure:	
Posting on Shoulder:	
Advance Detour Intersection Posting for Vertical Clearance 14'-0" or less:	

Note:

Vertical measurements are actual measures rounded down to the nearest inch. Posted clearances are typically 3 inches less than the lowest clearance for a particular through movement.



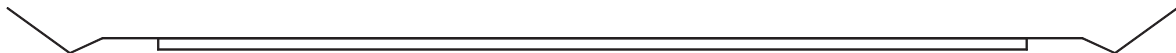
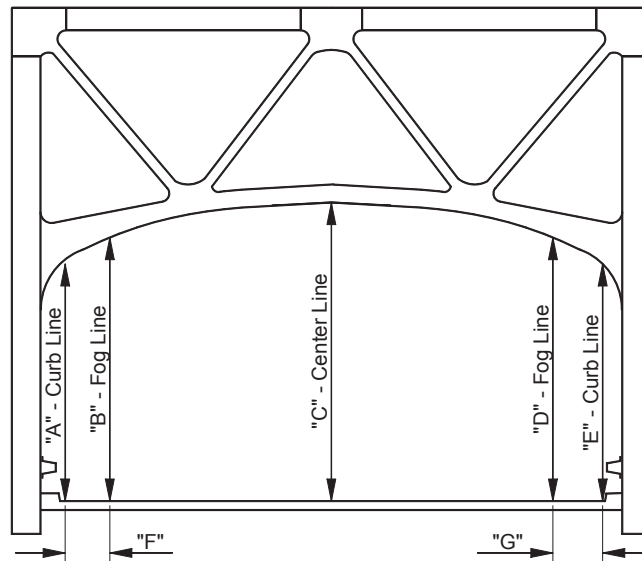


Exhibit 3-28 Vertical Clearance Card Steel

Bridge Number:	
Structure ID:	
Looking:	
Measurement Date:	
Photo Date:	
Inspection/Co Initials:	
Minimum Vertical Clearance Posted For:	
Posting on Structure:	
Posting on Shoulder:	
Advance Detour Intersection Posting for Vertical Clearance 14'-0" or less:	

Note:

Vertical measurements are actual measures rounded down to the nearest inch. Posted clearances are typically 3 inches less than the lowest clearance for a particular through movement.

[illegible]

[illegible]

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 1 of 23)

Bridge Inspection Pre-Activity Safety Plan Cover Sheet

This pre-activity safety plan covers all bridge inspection activities as indicated below for the WEEK/WEEKEND OF _____ TO _____.

LOCATION: BR NOs & MPs _____.

COUNTIES _____.

Our signatures below indicate that we have read the safety plan, that we understand the hazards related to the activities to be conducted, and that we will apply the appropriate controls to minimize the risks of accident and injury during the inspections.

LEAD INSPECTOR: _____ DATE: _____
(Name/Signature/Initials)

CO-INSPECTOR: _____ DATE: _____
(Name/Signature/Initials)

UBIT DRIVER: _____ DATE: _____
(Name/Signature/Initials)

Our initials below indicate that we have discussed and reaffirmed the hazards, risks and control measures prior to the start of daily activities (Tailgate Safety Meetings) *[For use on multiple-day inspections]*

	DATE				
LEAD INSPECTOR					
CO-INSPECTOR					
UBIT DRIVER					

Activities to be conducted during the above inspection dates (check all that apply):

<input type="checkbox"/> General Bridge Inspection Activities <input type="checkbox"/> Routine Inspection <input type="checkbox"/> Short Span Inspection <input type="checkbox"/> Safety Inspection <input type="checkbox"/> Interim Inspection <input type="checkbox"/> Special Inspection	<input type="checkbox"/> Equipment Bridge Inspection using a Bucket Truck, Man Lift, or other Boom Truck <input type="checkbox"/> Attach Fall Protection Plan
<input type="checkbox"/> UBIT Bridge Inspection <input type="checkbox"/> Attach Fall Protection Plan	<input type="checkbox"/> Bridge Climbing Inspection <input type="checkbox"/> Attach Fall Protection Plan
<input type="checkbox"/> Damage Inspection <input type="checkbox"/> Attach Fall Protection Plan	<input type="checkbox"/> Confined Space Entry <input type="checkbox"/> Attach Confined Entry Plan
<input type="checkbox"/> Scour Site Visit Bridge Inspection	<input type="checkbox"/> Underwater Inspection
<input type="checkbox"/> Boat Inspection	<input type="checkbox"/> Nondestructive Testing
<input type="checkbox"/>	<input type="checkbox"/>

Fill out the cover page to the Pre-Activity Safety Plan for each inspection trip. For multiple crew inspections fill out a sheet for each crew. For multiple bridges where more room is needed to list the bridges above attach a list of the bridges. This cover sheet must be filled out before the activities starts and must be present on site during the activities. Maintain these coversheets in chronological order in front of the Pre-Activity Safety Plan section of the Safety Binder and keep in the inspection vehicle. The lead inspector is responsible for all on site safety matters.

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 2 of 23)

Bridge Inspection Pre-Activity Safety Plan

Goal: The Washington State Department of Transportation (WSDOT) is committed to providing a healthy and safe workplace for all personnel; zero injuries, accidents, exposures, and the control of occupational hazards are key components of the goal.

Purpose: The purpose of the Pre-Activity Safety Plan is to provide a tool for inspection crews and supervisors to use in conducting safety training and tailgate briefings in order to identify hazards, assess the risks, and to implement control measures to minimize the risk of accidents and injuries while performing bridge inspection activities.

General: Bridges have many different hazards that may be encountered during inspection. There are two major types of inspection that generally occur, ROUTINE inspections and EQUIPMENT inspections using a UBIT (Under Bridge Inspection Truck), Bucket Truck, Man Lift, and other boom trucks.

Routine inspection entails a quick (generally <1 hour) inspection of a bridge by doing a walk-around and checking various bridge components. Routine inspections are generally a part of all inspections. Safety and Short Span inspections are special type inspections similar to routine inspections. The hazards associated with the Routine Inspections are inherent in these as well. Special Inspections and Interim Inspections can be in the form of a walking inspection similar to routine inspections and/or an equipment inspection.

Equipment inspections are performed in addition to routine inspections on bridges that require a close in depth inspection of areas that cannot be reached or safely reached on foot, ladder, or by remote devices such as fiber optic devices. Fracture Critical bridges are almost always inspected with equipment as are most of the Special Inspections and Damage Inspections. Equipment inspections are almost always in the form of a UBIT Inspection (see Figure 1) and are often accompanied by the use of a bucket truck, Genie Lift, and/or other man lift/boom trucks. They may also be performed without a UBIT truck based on the requirements of the inspection.

Lift trucks are often rented. Because there are many different brands and types of lift trucks, it is the responsibility of the inspection crew to inspect the equipment for serviceability and to ensure training on the particular piece of equipment is received prior to its use.

Equipment inspections almost always require a traffic control plan, flagging operations, and/or Truck Mounted Attenuators (TMAs) often referred to an 'Attenuator'. In most cases the region maintenance crew will develop the traffic control plan and provide flagging and attenuators as needed. This does not relieve the inspection crew of ensuring safety regarding these activities.

Bridge Climbing is an inspection technique used when a close in depth look of areas are required and an equipment inspection is not feasible such as when the areas may be out of reach of the equipment, load restrictions prohibit the use of equipment, or traffic control issues might prohibit the use of equipment. Climbing inspection activities may include rope access, in which a rope

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 3 of 23)

access plan shall be developed for the specific bridge and supplement this Pre-activity Safety Plan (PASP).



Figure 1 Typical multi-crew UBIT inspection

Scour inspections are performed on bridges over waterways and can be performed by walking, wading, boat, and or SCUBA diving (Underwater Inspection). Many times a scour evaluation is conducted in conjunction with routine and/or equipment inspections and requires measuring the depth and profile of the channel from the bridge deck with a rod or an incremented line and weight. Traffic and fall hazards are of concern in these cases, both of which have to be addressed simultaneously. When wading, or boating operations are performed, water safety needs to be addressed.

Bridge Preservation Office personnel are highly trained in the performance of their field activities. This PASP addresses all inspections that may occur on any bridge throughout the state. Hazards that are specific to a particular bridge will be addressed on-site. Discussion notes and mitigation measures are to be added to this PASP whenever specific hazards not already covered are found at a particular bridge site.

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 4 of 23)

Typical Procedures:

Routine Inspections: Lane closure is seldom necessary. There are two inspectors working out of one vehicle. The passenger navigates as the driver drives to the bridge. When arriving at the bridge, the inspector turns on the overhead beacons and finds a safe place to park near the bridge and out of traffic. Inspectors get out and inspect the abutments and walk the deck on foot.

Equipment Inspections: Closure of a lane is performed by maintenance crews. When the work zone is set up, maintenance will radio the inspection crew that they are ready. The UBIT and/or other equipment trucks will then enter the work zone. The engineers' inspection vehicle will follow behind. The engineers will then get in the UBIT truck (or other equipment) and start the inspection. After the UBIT inspection is complete, the engineers will finish the bridge by walking the deck and inspecting the abutments on foot.

For bucket truck operations without region traffic control (off the shoulder work), the inspectors will establish a safety zone and cone off the shoulder. Early warning signs may be required in accordance with Work Zone Traffic Control Guidelines, M 54-44.04

Scour Site Visit: A lane closure is seldom necessary. There are generally two inspectors working out of one vehicle. The passenger navigates as the driver drives to the bridge. When arriving at the bridge, the inspector turns on the overhead beacons and finds a safe place to park near the bridge and out of traffic. Inspectors get out and inspect the abutments, intermediate piers, and the associated waterway. When required, soundings from the bridge rail to the channel bed will be measured to create a stream cross section sketch.

Tasks, Hazards, and Controls:

TASK	HAZARDS	CONTROL When controls cannot be met as specified below or by readily available equivalent mitigating measures, the activity will be aborted and rescheduled after a specific plan of action is devised to mitigate the specific circumstances.
All Inspection Activities	Noise	Hearing conservation education. Wear hearing protection.

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 5 of 23)

All Inspection Activities	Traffic	If accident occurs, dial 911. If joint measurements are required, one inspector watches traffic to ensure the other can safely measure joints. Always walk the bridge decks in teams of two with one person inspecting and the other having the duties as a safety monitor.
All Inspection Activities	Needles/feces	Stay alert for these and avoid. See Appendix C.
All Inspection Activities	Pigeon guano	Avoid disturbance of guano
All Inspection Activities	Transients	Avoid transients and travel in pairs using the buddy system. Announce presence to transients.
All Inspection Activities	Weather	Not inspecting during thunderstorms and icy conditions.
All Inspection Activities	Walking the deck (moving Traffic)	Walk in a direction facing oncoming traffic. Be aware of escape routes in case of emergency.
All Inspection Activities	Walking the deck (Fall Hazard)	Bridge decks with rails less than 39" will be protected against inadvertent falls using a safety monitor. Using the 2-man inspection crew, one is the inspector, the other is the safety monitor. The safety monitor's only duty is to ensure the inspector's safety by watching the hazards and alerting the inspector as necessary when the risk increases.

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 6 of 23)

All Inspection Activities	Hazardous Materials	Review MSDS for all hazardous materials being used or expected to be encountered.
All Inspection Activities	Snake and spider bites	Provide first aid and drive to hospital if bitten. Take the offending animal with you ONLY if doing so does not create further hazard (i.e. the animal is dead). Be prepared to describe the animal if it cannot be taken. See Appendix D for the hospital list.
All Inspection Activities	Struck by falling objects	Avoid walking and working under suspended loads. Hard hats must be worn when working around backhoes, cranes, excavators, etc.
All Inspection Activities	Weather related illness	Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
All Inspection Activities	Strains and sprains due to Lifting	Proper lifting techniques shall be used. Get help or use lifting/hoisting equipment if necessary.

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 7 of 23)

All Inspection Activities	Slips trips and falls (General)	Be aware of loose materials, excavation drop-off, tripping hazards and other obstructions. Keep walk spaces and work areas free from loose materials or tools. Avoid dangerous terrain when possible. Use alternate route.
All Inspection Activities	Slips trips and falls (Steep Slopes)	Steep slopes (typically 2 vertical to 1 horizontal) are to be assessed on-site. A plan will be discussed to protect inadvertent falls before negotiating the slope. Surface conditions and weather are part of the assessment which can turn a lesser slope into a hazard.
Confined Space Inspection Activities	Confined space entry in box girders.	Complete confined space entry plan (Appendix A) if the confined space is permit required. Carry gas monitors while performing inspection. Use the buddy system. If asphyxiation of person in confined space occurs, partner dials 911 instead of entering the space.
All Inspection Activities requiring the use of Ladders	Falling from ladder.	Find stable footing for ladder. Have co-inspector help with anchoring ladder base.
All Inspection Activities requiring Wading	Falling, drowning	Use probe to help balance and to avoid drop-offs.
All Inspection Activities requiring the use of Hand Tools (Power and Manual)	Cuts, pinches and debris in eyes.	Follow operating instructions. Use appropriate PPEs.

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 8 of 23)

All Inspection Activities requiring the negotiation of Fences and Barriers	Falling, strains and cuts	Use fence climber tool. Cut fence if required. Attempt to find alternate route.
All Inspection Activities requiring reaching across Bridge Rails	Falling	When inspection activities require reaching or looking over the bridge rail the following requirements will be met: The deck surface will be free of debris that may pose a slipping or tripping hazard. Three points of contact (minimum) will be maintained at all times, two of which will be both feet flat on the bridge deck or sidewalk (the third can be a hand or arm) such that the body is braced at all times to prevent falling over. And, a safety Monitor will be used. The second person in the inspection team will be designated as a safety monitor and will have only the duties of observing for and alerting the inspector of hazards.
All Inspection Activities around and near Railways	Railroad beneath the bridge	Obtain flagging from the Railroad. If RR flagging is not present, maintain a minimum of 25 ft. clear distance from the track centerline.
Bucket truck or manlift inspection.	The hazards present are the same for UBIT inspection except that this equipment is often rented.	Careful inspection of manlift equipment before use.
Work Boat	Struck by, drowning	Perform pre-operational checks, PFD.
Fences	Falling, strains and cuts	Use fence climber tool. Cut fence if required. Attempt to find alternate route.
Nondestructive testing: Dye Penetrant, Ultrasonic	Paint/ dye penetrant inhalation	Taking care not to inhale fumes. Not smoking while handling these products.

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 9 of 23)

UBIT and Equipment Inspections	Falling	Complete fall protection plan (Appendix B). Use and follow fall protection plan.
UBIT and Equipment Inspections	Power lines	Maintain distances on power lines as called out on safety placard posted on UBIT bucket. Shut down power in lines when bridge is unable to be inspected without maintaining a safe distance. If electrocution occurs, dial 911 on cell phone.
UBIT and Equipment Inspections	Traffic	Set up flagging on bridge to take the lane (performed by maintenance).
UBIT and Equipment Inspections	Hydraulic failure in UBIT	If total failure occurs, use Rollgliss.
UBIT and Equipment Inspections	Weather	Not inspecting during thunderstorms and icy conditions.
UBIT and Equipment Inspections	Struck by falling objects	Avoid walking and working under suspended loads. Hard hats must be worn when working around backhoes, cranes, excavators, etc.
UBIT and Equipment Inspections	Weather related illness	Take extra precautions to prevent heat and cold stress when working in extremely hot or cold temperatures.
UBIT and Equipment Inspections	Overhead hazards.	Wearing hard-hats while inspecting in and around equipment.
UBIT and Equipment Inspections	Lead exposure	When grinding occurs, use dust masks to prevent inhalation of dust. Wear coveralls to keep dust off clothes. Use eye protection.
UBIT Inspections	Hydraulic failure in UBIT	If total failure occurs, use Rogliss.

Exhibit 3-30 Pre-Activity Safety Plan (PASP)
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Scour Inspections	Taking Soundings from the bridge rail.	When inspection activities require reaching or looking over the bridge rail the following requirements will be met: The deck surface will be free of debris that may pose a slipping or tripping hazard. Three points of contact (minimum) will be maintained at all times, two of which will be both feet flat on the bridge deck or sidewalk (the third can be a hand or arm) such that the body is braced at all times to prevent falling over. And, a safety Monitor will be used. The second person in the inspection team will be designated as a safety monitor and will have only the duties of observing for and alerting the inspector of hazards.

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APPENDIX A: CONFINED SPACE ENTRY



Washington State
Department of Transportation

Confined Space Entry and Hot Work Permit

NOTE: This form is required to be completed, appropriately signed prior to, and utilized during entry into any confined space.

Confined Space ID No.		Region		Region Safety Manager	
Type of Work: <input type="checkbox"/> Overhead <input type="checkbox"/> Under Foot		Location			
Purpose of Entry					
This space entered _____ times per <input type="checkbox"/> Day <input type="checkbox"/> Week <input type="checkbox"/> Month <input type="checkbox"/> Year					
Description of Work					
Employees Assigned Entry				Date / Time Issued	
Authorized Attendants				Date / Time Expired	

Have the Following Precautions Been Taken?	Yes	No	N/A
Were hazards, testing, and emergency procedures discussed?			
Have authorized entrants and attendants been trained regarding confined spaces?			
Has safety equipment been properly calibrated and checked?			
Have the duties of the authorized entrants and attendants been discussed?			
Have emergency response or rescue procedures been discussed?			

What are the Potential Work Hazards? (Check all that apply)

<input type="checkbox"/> Corrosives	<input type="checkbox"/> Flammable Materials	<input type="checkbox"/> Hazardous Atmosphere	<input type="checkbox"/> Mechanical	<input type="checkbox"/> Ladders Over 10 Ft.
<input type="checkbox"/> Hot Work (riveting, welding, grinding, burning)	<input type="checkbox"/> Dust	<input type="checkbox"/> Electrical	<input type="checkbox"/> Biological	<input type="checkbox"/> Temperature
<input type="checkbox"/> Other (specify):				

Personal Protective and Safety Equipment? (Check all that apply)

<input type="checkbox"/> Atmosphere Monitoring (complete next section)	<input type="checkbox"/> Communications Equipment	<input type="checkbox"/> Respiratory Protection	<input type="checkbox"/> Hearing
<input type="checkbox"/> Life Lines and Harness	<input type="checkbox"/> Ventilation Equipment	<input type="checkbox"/> Head, Hand, Foot, and Eye	
<input type="checkbox"/> Other (specify):			

DOT Form 750-094 EF
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APPENDIX A: CONFINED SPACE ENTRY

Atmospheric Monitoring Equipment/Instrument

Make	Model	Serial No.
Date of Calibration	Other	

Atmospheric Monitoring Equipment - Equipment Check and Calibration

Concentration of Calibration Gases and Instrument Readings: Gas Concentration | Instrument Reading

Oxygen	Flammables	Carbon Monoxide	Other: _____
_____	_____	_____	_____

Note: Make sure calibration gas cylinders have not expired. If the instrument readings are not within 5-10% of the known gas concentrations, recalibrate or send in to manufacturer for recalibration.

Atmospheric Test Results

Date / Time	Oxygen	Flammability	Carbon Monoxide	Other

Is "hot work" (riveting, welding, cutting, brazing, burning, grinding) to be performed in the confined space? ☐ Yes ☐ No
If Yes, complete the Hot Work Section. If No, skip to Page 3, Qualified Person Verification and Signature Section

Hot Work

Description of Work or Equipment Presenting a Potential Ignition Source or Generating a Hazardous Atmosphere
Have employees been properly trained, advised, and monitored with regards to hot work performed in confined spaces? <input type="checkbox"/> Yes <input type="checkbox"/> No IF YOU ANSWERED NO, STOP ALL WORK ACTIVITIES AND CONSULT WITH MANAGERS.
Does the working surface or equipment being used have a potential of generating toxic gases, fumes, dust, or vapors? Check all that apply: <input type="checkbox"/> Welding Rods and Flux <input type="checkbox"/> Silica or Respirable Dusts <input type="checkbox"/> Oxygen Displacement <input type="checkbox"/> Other _____ <input type="checkbox"/> Lead Paint / Paint <input type="checkbox"/> Animal Wastes <input type="checkbox"/> Carbon Monoxide _____
Describe in detail the type of ventilation (volumes, air exchanges, air intakes, that will be used to remove the gases, fumes, dust, or vapors.

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APPENDIX A: CONFINED SPACE ENTRY

Hot Work - Continued

Describe in detail the personal protective equipment to be used during the hot work activities:

Respiratory Requirements:
Atmosphere Monitoring Equipment:
Rescue Equipment or Rescue Team:
Fire Extinguishing Media:
Head, Foot, Hand, Eye:
Other:

Atmospheric Monitoring Data During Hot Work (must be continuous)

Date / Time	Oxygen	Flammability	Carbon Monoxide	Other

Is employee exposure monitoring being performed during the hot work activities? ☐ Yes ☐ No If yes, describe the monitoring:

--

Qualified Person Verification and Signature

I have verified the procedures and work activities and have briefed the Authorized Entrants and Attendants on the proper practices and associated hazards of confined spaces and the associated work activities.

Name of Qualified Person	Phone	Date
Signature of Qualified Person	Organization	

This Confined Space Entry and Hot Work Permit serves as a master record for data and information collected during the field operations and confined space entry. The qualified person shall annually provide copies of the completed forms to their respective Region Safety Manager. It is recommended that all completed forms be kept on file for at least five years.

DOT Form 750-094 EF
Revised 2/2000

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APPENDIX B: TOWER AND BRIDGE FALL PROTECTION PLAN



Washington State
Department of Transportation

**Tower and Bridge
Fall Protection Plan**

Date	Location	Prepared By
Description of Work		
Recognized Fall Hazards <div style="display: flex; flex-wrap: wrap;"> <div style="width: 33%;"> <input type="checkbox"/> Tower <input type="checkbox"/> Self-Support <input type="checkbox"/> Guyed <input type="checkbox"/> Monopole <input type="checkbox"/> Light Pole <input type="checkbox"/> Wooden Pole <input type="checkbox"/> Walkway w/o Fall Restraint <input type="checkbox"/> Staircase w/o Fall Restraint <input type="checkbox"/> Weakened or Damage (e.g., missing member/hardware) </div> <div style="width: 33%;"> <input type="checkbox"/> Bridge <input type="checkbox"/> Suspension <input type="checkbox"/> Cantilever <input type="checkbox"/> Arch <input type="checkbox"/> Draw <input type="checkbox"/> Other </div> <div style="width: 33%;"> <input type="checkbox"/> Non-Standard <input type="checkbox"/> Roof Top <input type="checkbox"/> Building Side <input type="checkbox"/> Highway Sign Structure <input type="checkbox"/> Other </div> <div style="width: 33%;"> <input type="checkbox"/> Ladder w/o Fall Restraint <input type="checkbox"/> Step Bolts w/o Fall Restraint <input type="checkbox"/> Work Deck w/o Fall Restraint <input type="checkbox"/> Rest Platform w/o Fall Restraint <input type="checkbox"/> Other </div> </div> <div style="margin-top: 5px;"> <input type="checkbox"/> Motorized Vehicular Traffic </div>		
Recognized Environmental Hazards <input type="checkbox"/> Sun <input type="checkbox"/> Rain <input type="checkbox"/> Snow <input type="checkbox"/> Heat/Ice <input type="checkbox"/> Cold <input type="checkbox"/> Noise <input type="checkbox"/> Darkness		
Recognized Live Hazards <input type="checkbox"/> Birds <input type="checkbox"/> Insects <input type="checkbox"/> Reptiles <input type="checkbox"/> Human <input type="checkbox"/> Other _____		
Other Recognized Hazards <input type="checkbox"/> Electrical <input type="checkbox"/> Rf Exposure		
Method of Fall Restraint and/or Arrest (PFAS) to be Used <div style="display: flex; flex-wrap: wrap;"> <div style="width: 33%;"> <input type="checkbox"/> Work Deck <input type="checkbox"/> Railing <input type="checkbox"/> Positioning Lanyard <input type="checkbox"/> Ladder Safety Climb <input type="checkbox"/> Warning Signs Lines </div> <div style="width: 33%;"> <input type="checkbox"/> Full Body Harness <input type="checkbox"/> Shock Absorbing Lanyard <input type="checkbox"/> Self Retracting Lanyard <input type="checkbox"/> Vertical Life Line <input type="checkbox"/> Horizontal Life Line </div> <div style="width: 33%;"> <input type="checkbox"/> Work Platform <input type="checkbox"/> Rest Platform <input type="checkbox"/> Walkway <input type="checkbox"/> Tie-Off Point Capable of 5,000 Lbs. per Person </div> </div>		
Personal Protection Equipment (PPE) to be Used <div style="display: flex; flex-wrap: wrap;"> <div style="width: 33%;"> <input type="checkbox"/> Hard Hat <input type="checkbox"/> Safety Eyewear <input type="checkbox"/> Rain Wear <input type="checkbox"/> Face Wear </div> <div style="width: 33%;"> <input type="checkbox"/> Gloves <input type="checkbox"/> Heaving Clothing <input type="checkbox"/> Heavy Footwear <input type="checkbox"/> Other _____ </div> <div style="width: 33%;"> Tool Handling: <input type="checkbox"/> Tool Belts <input type="checkbox"/> Tool Bucket <input type="checkbox"/> Other _____ </div> </div>		
Method of Hoisting Used <input type="checkbox"/> Winch <input type="checkbox"/> Block and Tackle <input type="checkbox"/> Capstan <input type="checkbox"/> Manual <input type="checkbox"/> Crane <input type="checkbox"/> Boom Truck		
Method of Manriding Line Used <input type="checkbox"/> Descent/Suspension w/PFAS <input type="checkbox"/> Ascending/Decending w/PFAS		

Note: Upon hearing the sound of thunder, caused by lightening strike activity, all high structure climbing and work shall cease and all climbing personnel are to immediately mobilize safely off the structure and seek shelter below the tower. Work shall not resume until it is deemed safe.

DOT Form 750-001A EF
1/2005

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APPENDIX B: TOWER AND BRIDGE FALL PROTECTION PLAN

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APPENDIX C: BLOODBORNE PATHOGENS

**BLOODBORNE PATHOGENS
EXPOSURE CONTROL PLAN**

Facility Name: Bridge Preservation Office

Date of Preparation: February 21, 2007

A. Purpose

The Bloodborne Pathogens Exposure Control Plan is to reduce or eliminate occupational exposure to bloodborne pathogens.

B. Exposure Determination

Employees that may come into contact with human blood or other potentially infectious materials (OPIM) are listed on Page 5 of this appendix.

C. Methods of Compliance

Universal Precautions will be utilized in the handling of all human blood and OPIMs. Please refer to WSDOT's Bloodborne Pathogens Policy, Chapter 7 of Safety Procedures and Guidelines Manual, M75-01.

D. Engineering Controls

1. Employees will wash their hands and any other exposed skin thoroughly with soap and hot water immediately or as soon as possible after contact with blood or OPIM in a manner causing friction on both inner and outer surfaces of the hands.
2. Employees will be provided with antiseptic hand cleaner and paper towels when hand washing is not feasible. However, hand washing must still take place as soon as possible after exposure.
3. Eating, drinking, smoking, applying cosmetics or lip balm and handling contact lenses is prohibited in work areas where there is the potential for exposure to bloodborne pathogens.
4. If professional medical attention is required, a local ambulance will be the first choice; a personal car will be the second. If a personal car is taken, impervious material should be used to prevent contamination of the vehicle.
5. New employees or employee being transferred to other sections will receive training about any potential exposure from the Regional Safety Manager.
6. This Exposure Control Plan will be a part of the BPO office Pre-activity Safety Plans when exposure to bloodborne pathogens is recognized during pre-job hazard assessment.

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Exhibit 3-30 Pre-Activity Safety Plan (PASP)
(Page 17 of 23)**APPENDIX C: BLOODBORNE PATHOGENS****E. Personal Protective Equipment**

All personal protective equipment, such as gloves, contaminated materials handling tools or equipment, biohazard bags used will be provided without cost to employees. Personal protective equipment will be chosen based on the anticipated exposure to blood or OPIM. The protective equipment will be considered appropriate only if it does not permit blood or OPIM to pass through or reach the employees' clothing, skin, eyes, mouth, or other mucous membranes under normal conditions of use.

F. Disposal of Contaminated Items and Communication of Hazard

1. Employees must:
 - a. use bleach to disinfect any blood or OPIM.
 - b. apply the bleach with single-use gloves and allow contact for at least 15 minutes.
 - c. place any single-use gloves that have been contaminated in a biohazard bag and cover.
 - i. contact your Regional Safety Managers for the proper disposal of biohazard bags or other impervious containers.
 - ii. regulated waste should be placed in appropriate containers, label and disposed of in accordance with Chapter 296-823, WAC
2. Employees will be warned of biohazard bags by labels attached to the disposal bags. Labels used will be orange-red and marked with the work **BIOHAZARD** or the biohazard symbol.

G. Housekeeping

Maintaining our work areas in a clean and sanitary condition is an important part of WSDOT's Bloodborne Pathogens Compliance Program. Employees must decontaminate working surfaces and equipment with an appropriate disinfectant after completing procedures involving blood or OPIM. All equipment, environmental surfaces and work surfaces shall be decontaminated immediately or as soon as feasible after contamination.

1. Employees must clean and disinfect when surfaces become contaminated and after any spill of blood or OPIM.
2. Employees will use a solution of one part bleach to ten parts water for cleaning and disinfecting.
3. Working surfaces and equipment will be cleaned, disinfected and maintain.
4. Potentially contaminated broken glass will be picked up using mechanical means, such as dustpan and brush, tongs, etc.

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Exhibit 3-30 Pre-Activity Safety Plan (PASP)
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5. Use universal precautions for handling of all soiled laundry.
6. Laundry contaminated with blood or OPIM will be handled as little as possible. Employees who handle contaminated laundry will utilize personal protective equipment to prevent contact with blood or OPIM from coming into contact skin or street clothes.
7. Contaminated clothing will remain on the premises, or will be sent directly to a laundry facility for cleaning. Employees will be given the option of reimbursement for the cost of contaminated clothing and the clothing will be disposed.

H. Hepatitis B Vaccination and Post-Exposure Evaluation and Follow-Up

1. WSDOT shall make available within 24 hours of possible exposure the Hepatitis B vaccine and vaccination series to all employees who have occupational exposure. Vaccination is not required if:
 - a. Employee has previously received the completed Hep B vaccination series.
 - b. An antibody test has revealed that the employee is immune to hepatitis B.
 - c. There are medical reasons not to give the vaccine, usually determined by the employee's physician.
2. An employee who refuses the vaccination is required to sign a Hepatitis B Vaccination Declaration Form, Appendix 7-C in Chapter 7 of the Safety Manual which will be retained indefinitely in the employee's Safety and Health file located at the HQ Safety Office.
3. An exposure incident means a specific eye, mouth, other mucous membrane, non-intact skin or parenteral contact with blood or OPIM that result from the performance of an employee's duties. Examples of non-intact skin include skin with dermatitis, hangnails, cuts, abrasions, chafing or acne. Any employee having an exposure incident shall contact the Regional Safety Manager immediately. All employees who have an exposure incident will be offered a confidential post-exposure evaluation and follow-up in accordance with the DOSH standard. This includes a visit to a physician selected by the employee where an L&I claim can be initiated. The health care professional written opinion will be provided to the employee within 15 days of the evaluation.

I. Training

Training is provided at the time of initial assignment to tasks where occupational exposure may occur, and that it shall be repeated within twelve months of the previous training. Training shall be tailored to the education and language level of the employee, and offered during the normal work shift. The training will be interactive and cover the following:

1. a copy of the standard and an explanation of its contents;
2. a discussion of the epidemiology and symptoms of bloodborne diseases;

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Exhibit 3-30 Pre-Activity Safety Plan (PASP)
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3. an explanation of the modes of transmission of bloodborne pathogens;
4. an explanation of the WSDOT Bloodborne Pathogen Exposure Control Plan (this program), and a method for obtaining a copy;
5. the recognition of tasks that may involve exposure;
6. an explanation of the use and limitations of methods to reduce exposure, for example engineering controls, work practices and personal protective equipment;
7. information on the types, use, location, removal, handling, decontamination, and disposal of PPE;
8. explanation of the basis of selections of PPE;
9. information on the Hepatitis B vaccination, including efficacy, safety, method of administration, benefits, and that it will be offered free of charge;
10. information on the appropriate actions to take and persons to contact in an emergency involving blood or OPIM;
11. explanation of the procedures to follow if an exposure incident occurs, including the method or reporting and medical follow-up;
12. information on the evaluation and follow-up required after an employee exposure incident;
13. an explanation of the signs, labels, and color-coding systems.

J. Exposure Reporting and Recordkeeping

1. Exposures, including first aid incident exposures that involve the presence of blood or OPIM must be reported to the supervisor and the Regional Safety Manager before the end of the work shift. An Accident Form, 750-100 must be completed to include the names of all the first-aid providers who rendered assistance, the time and date of the first-aid incident and a description of the first-aid incident.
2. Medical records shall be maintained in accordance with DOSH Standards. These records shall be kept confidential, and must be maintained at the HQ Safety and Health Office for at least the duration of employment plus 30 years.

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APPENDIX D: HOSPITALS

NAME	ADDRESS	CITY	COUNTY	PHONE
Grays Harbor Community Hospital	915 Anderson Drive	Aberdeen	Grays Harbor	(360) 532-8330
Island Hospital	1211 - 24th	Anacortes	Skagit	(360) 299-1300
Cascade Valley Hospital and Clinics	330 S. Stillaguamish Avenue	Arlington	Snohomish	(360) 435-2133
Auburn Regional Medical Center	202 N. Division Street	Auburn	King	(253) 833-7711
Overlake Hospital Medical Center	1035 - 116th NE	Bellevue	King	(425) 688-5000
St. Joseph Hospital	2901 Squalicum Parkway	Bellingham	Whatcom	(360) 734-5400
Harrison Medical Center	2520 Cherry Avenue	Bremerton	Kitsap	(360) 377-3911
Naval Hospital	HP 01 Boone Road	Bremerton	Kitsap	(360) 475-4210
Okanogan Douglas District Hospital	507 Hospital Way	Brewster	Okanogan	(509) 689-2517
Highline Medical Center	16251 Sylvester Road SW	Burien	King	(206) 244-9970
Providence Centralia Hospital	914 South Scheuber Road	Centralia	Lewis	(360) 736-2803
Lake Chelan Community Hospital	503 E. Highland Avenue	Chelan	Chelan	(509) 682-3300
St. Joseph's Hospital	500 East Webster	Chewelah	Stevens	(509) 935-8211
Tri-State Memorial Hospital	1221 Highland Ave.	Clarkston	Asotin	(509) 758-5511
Whitman Hospital and Medical Center	1200 West Fairview	Colfax	Whitman	(509) 397-3435
Mount Carmel Hospital	982 E. Columbia	Colville	Stevens	(509) 684-2561
Whidbey General Hospital	101 N. Main Street	Coupeville	Island	(360) 678-5151
Lincoln Hospital	10 Nicholls Street	Davenport	Lincoln	(509) 725-7101
Dayton General Hospital	1012 S. Third Street	Dayton	Columbia	(509) 382-2531
Deer Park Hospital	1015 E. "D" Street	Deer Park	Spokane	(509) 276-5061
Stevens Healthcare	21601 76th Avenue West	Edmonds	Snohomish	(425) 640-4000
Kittitas Valley Community Hospital	603 S. Chestnut	Ellensburg	Kittitas	(509) 962-9841
Enumclaw Regional Hospital	1450 Battersby Avenue	Enumclaw	King	(360) 825-2505
Columbia Basin Hospital	200 Nat Washington Way	Ephrata	Grant	(509) 754-4631
Providence Everett Medical Center	1321 Colby	Everett	Snohomish	(425) 261-2000
St. Francis Hospital	34515 9th Avenue South	Federal Way	King	(253) 944-8100
Forks Community Hospital	530 Bogachiel Way	Forks	Clallam	(360) 374-6271
Klickitat Valley Health	310 S. Roosevelt	Goldendale	Klickitat	(509) 773-4022
Coulee Community Hospital	411 Fortuyn Road	Grand Coulee	Grant	(509) 633-1753
Ocean Beach Hospital	174 - 1st Avenue North	Ilwaco	Pacific	(360) 642-3181
Kennewick General Hospital	900 S. Auburn	Kennewick	Benton	(509) 586-6111
Evergreen Healthcare	12040 NE 128th Street	Kirkland	King	(425) 899-1000
Fairfax Hospital	10200 N.E. 132nd Street	Kirkland	King	(425) 821-2000

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APPENDIX D: HOSPITALS

NAME	ADDRESS	CITY	COUNTY	PHONE
Cascade Medical Center	817 Commercial Street	Leavenworth	Chelan	(509) 548-5815
PeaceHealth, St. John Medical Center	1615 Delaware Street	Longview	Cowlitz	(360) 414-2000
Mark Reed Hospital	322 South Birch Street	McCleary	Grays Harbor	(360) 495-3244
Valley General Hospital	14701 - 179th SE	Monroe	Snohomish	(360) 794-7497
Morton General Hospital	521 Adams Street	Morton	Lewis	(360) 496-5112
Samaritan Healthcare	801 E. Wheeler Road	Moses Lake	Grant	(509) 765-5606
Skagit Valley Hospital	1415 E Kincaid Street	Mount Vernon	Skagit	(360) 424-4111
Newport Hospital & Health Services	714 West Pine	Newport	Pend Oreille	(509) 447-2441
Odessa Memorial Healthcare Center	502 E. Amende Drive	Odessa	Lincoln	(509) 982-2611
Capital Medical Center	3900 Capital Mall Drive S.W.	Olympia	Thurston	(360) 956-2550
Providence St. Peter Hospital	413 Lilly Road N.E.	Olympia	Thurston	(360) 491-9480
Mid-Valley Hospital	810 Jasmine	Omak	Okanogan	(509) 826-1760
Othello Community Hospital	315 N. 14th Avenue	Othello	Adams	(509) 488-2636
Lourdes Medical Center	520 N. 4th Avenue	Pasco	Franklin	(509) 547-7704
Garfield County Public Hospital District	66 North Sixth Street	Pomeroy	Garfield	(509) 843-1591
Olympic Medical Center	939 Caroline Street	Port Angeles	Clallam	(360) 417-7000
Jefferson Healthcare	834 Sheridan	Port Townsend	Jefferson	(360) 385-2200
Prosser Memorial Hospital	723 Memorial Street	Prosser	Benton	(509) 786-2222
Pullman Regional Hospital	835 SE Bishop Boulevard	Pullman	Whitman	(509) 332-2541
Good Samaritan Community Healthcare	407 14th Avenue S.E.	Puyallup	Pierce	(253) 697-4000
Quincy Valley Medical Center	908 10th Avenue S.W.	Quincy	Grant	(509) 787-3531
Group Health Cooperative/Eastside Hosp	2700 152nd N.E.	Redmond	King	(425) 883-5151
Valley Medical Center	400 S. 43rd Street	Renton	King	(425) 228-3450
Ferry County Memorial Hospital	36 Klondike Road	Republic	Ferry	(509) 775-3333
Kadlec Medical Center	888 Swift Boulevard	Richland	Benton	(509) 946-4611
Lourdes Counseling Center	1175 Carondelet Drive	Richland	Benton	(509) 943-9104
East Adams Rural Hospital	903 S. Adams	Ritzville	Adams	(509) 659-1200
Children's Hospital and Reg Med Ctr	4800 Sand Point Way N.E.	Seattle	King	(206) 987-2000
Group Health Cooperative/Central Hosp	201 16th Avenue East	Seattle	King	(206) 326-3000
Harborview Medical Center	325 Ninth Avenue	Seattle	King	(206) 731-3000
Kindred Hospital Seattle	10631 8th Avenue N.E.	Seattle	King	(206) 364-2050
Northwest Hospital & Medical Center	1550 North 115th Street	Seattle	King	(206) 364-0500
Regional Hosp for Resp & Complex Care	12844 Military Road South	Seattle	King	(206) 248-4604
Seattle Cancer Care	825 Eastlake E	Seattle	King	(206) 288-1400

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APPENDIX D: HOSPITALS

NAME	ADDRESS	CITY	COUNTY	PHONE
Alliance				
Swedish Medical Center/Ballard	5300 Tallman Avenue NW	Seattle	King	(206) 782-2700
Swedish Medical Center/First Hill	747 Broadway	Seattle	King	(206) 386-6000
Swedish Medical Center/Providence	500 17th Avenue	Seattle	King	(206) 320-2000
University of WA Medical Center	1959 N.E. Pacific Street	Seattle	King	(206) 598-3300
VA Puget Sound Health Care System	1660 South Columbian Way	Seattle	King	(206) 762-1010
Virginia Mason Medical Center	1100 Ninth Avenue	Seattle	King	(206) 624-1144
West Seattle Psychiatric Hospital	2600 SW Holden Street	Seattle	King	(206) 933-7000
United General Hospital	2000 Hospital Drive	Sedro-Woolley	Skagit	(360) 856-6021
Mason General Hospital	901 Mt. View Drive, Bldg. 1	Shelton	Mason	(360) 426-1611
Snoqualmie Valley Hospital	9575 Ethan Wade Way SE	Snoqualmie	King	(425) 831-2300
Willapa Harbor Hospital	800 Alder Street	South Bend	Pacific	(360) 875-5526
Deaconess Medical Center	800 West Fifth Avenue	Spokane	Spokane	(509) 458-5800
Holy Family Hospital	N. 5633 Lidgerwood Street	Spokane	Spokane	(509) 482-0111
Sacred Heart Medical Center	101 West Eighth Avenue	Spokane	Spokane	(509) 474-3131
Shriners Hospital for Children	911 West Fifth Avenue	Spokane	Spokane	(509) 455-7844
St. Luke's Rehabilitation Institute	711 South Cowley Avenue	Spokane	Spokane	(509) 473-6298
Valley Hospital & Medical Center	12606 E. Mission Avenue	Spokane Valley	Spokane	(509) 924-6650
Sunnyside Community Hospital	1016 Tacoma Avenue	Sunnyside	Yakima	(509) 837-1500
Allenmore Hospital	S. 19th & Union	Tacoma	Pierce	(253) 459-6633
Madigan Army Medical Center	9040 A Reid Street	Tacoma	Pierce	(253) 968-1210
Mary Bridge Children's Hosp & Hlth Ctr	317 Martin Luther King Jr. Way	Tacoma	Pierce	(253) 403-1400
St. Clare Hospital	11315 Bridgeport Way S.W.	Tacoma	Pierce	(253) 588-1711
St. Joseph Medical Center	1717 South "J" Street	Tacoma	Pierce	(253) 426-4101
Tacoma General Hospital	315 Martin Luther King Jr. Way	Tacoma	Pierce	(253) 403-1000
North Valley Hospital	203 South Western Avenue	Tonasket	Okanogan	(509) 486-2151
Toppenish Community Hospital	502 West Fourth Avenue	Toppenish	Yakima	(509) 865-3105
Highline Medical Center/Specialty Campus	12844 Military Road South	Tukwila	King	(206) 244-0180
Legacy Salmon Creek Hospital	2211 NE 139th Street	Vancouver	Clark	(360) 487-1000
Southwest Washington Medical Center	400 NE Mother Joseph Place	Vancouver	Clark	(360) 256-2000

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APPENDIX D: HOSPITALS

NAME	ADDRESS	CITY	COUNTY	PHONE
St. Mary Medical Center	401 W. Poplar	Walla Walla	Walla Walla	(509) 525-3320
Walla Walla General Hospital	1025 S. Secord Avenue	Walla Walla	Walla Walla	(509) 525-0480
Central Washington Hospital	1201 South Miller Street	Wenatchee	Chelan	(509) 662-1511
Wenatchee Valley Hospital	820 North Chelan Avenue	Wenatchee	Chelan	(509) 663-8711
Skyline Hospital	211 Skyline Drive	White Salmon	Klickitat	(509) 493-1101
Yakima Regional Med & Cardiac Ctr	110 S. Ninth Avenue	Yakima	Yakima	(509) 575-5000
Yakima Valley Memorial Hospital	2811 Tieton Drive	Yakima	Yakima	(509) 575-8000

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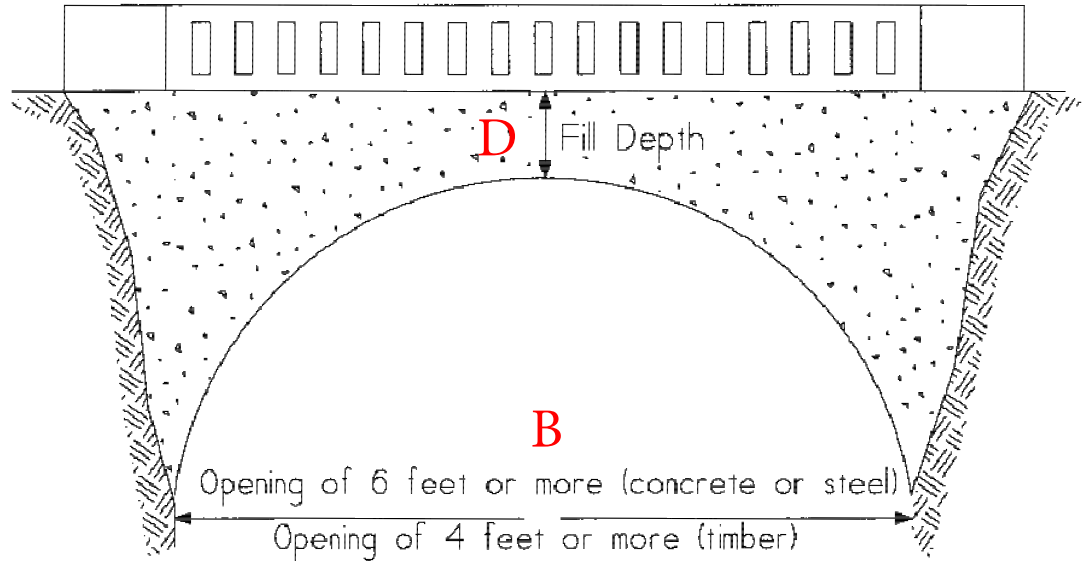
3-6 Appendices

Appendix 3-A1	Bridge With Fill on Deck
Appendix 3-A2	Bridge With No Fill on Deck
Appendix 3-A3	Culvert With Fill on Deck
Appendix 3-B	UBIT Inspections and Procedures
Appendix 3-C	FHWA Letter for Routine Extended Frequency Inspections
Appendix 3-D	FHWA Letter for Bridge Special Feature Inspections

Appendix 3-A1 Short Span Bridge With Fill on Deck

Short Span Inspections are recommended and performed by the Washington State Department of Transportation (WSDOT) Bridge Preservation Office when the following criteria are met:

1. Depth of fill (D) must be less than $B/2$ (where B = Maximum opening distance).
2. CONCRETE Structures: Opening of 6 feet or more.
STEEL Structures: Opening of 6 feet or more.
TIMBER Structures: Opening of 4 feet or more.

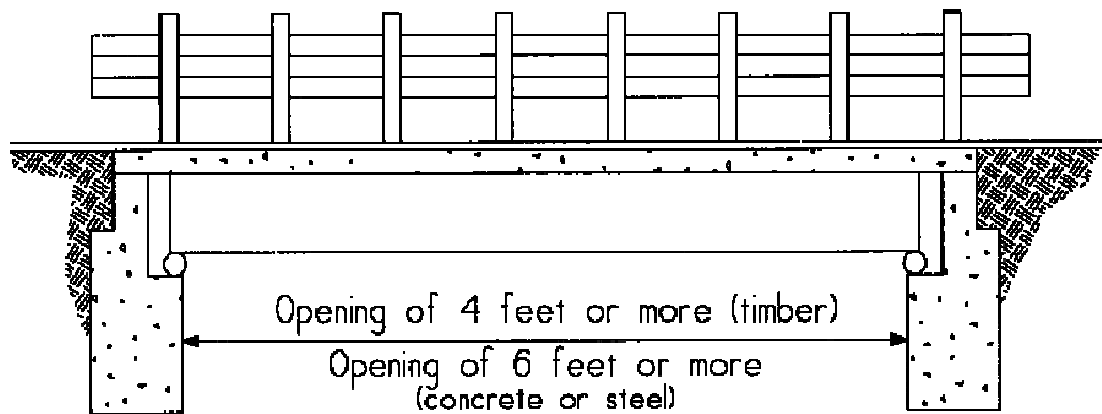


3. If the criteria does not meet items 1 and 2 above, the structure is considered to be a maintenance structure. It is the responsibility of the maintenance office in that area to inspect and maintain.
4. The Team Leader that determines that a structure is now a maintenance responsibility shall ensure that this information is passed on to the proper contacts.

Appendix 3-A2 *Short Span Bridge With No Fill on Deck*

Short Span Inspections are recommended and performed by the Washington State Department of Transportation (WSDOT) Bridge Preservation Office when the following criteria are met:

1. CONCRETE Structures: Opening of 6 feet or more.
STEEL Structures: Opening of 6 feet or more.
TIMBER Structures: Opening of 4 feet or more.

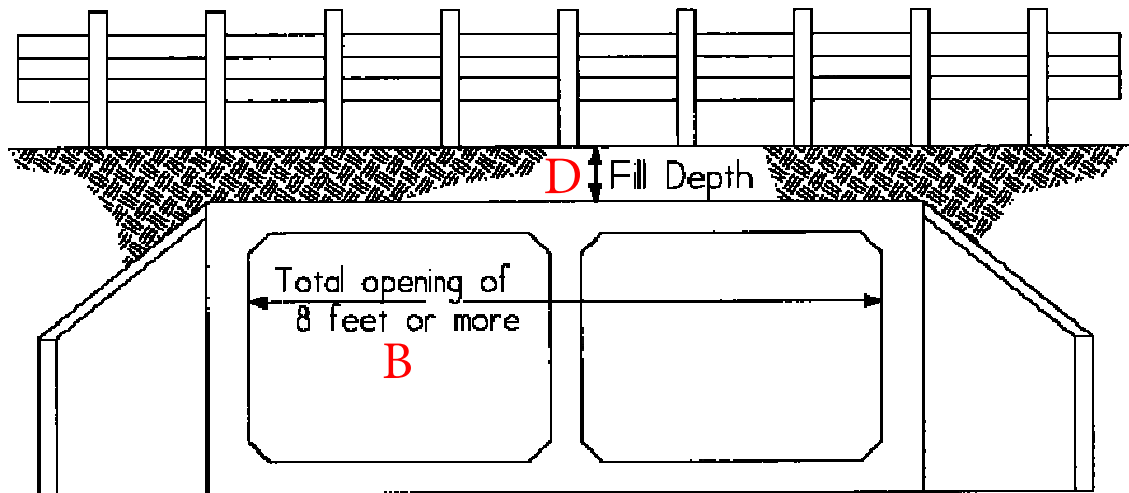


2. The Team Leader that determines that a structure is now a maintenance responsibility shall ensure that this information is passed on to the proper contacts.

Appendix 3-A3 *Short Span Culvert With Fill on Deck*

Short Span Inspections are recommended and performed by the Washington State Department of Transportation (WSDOT) Bridge Preservation Office when the following criteria are met:

1. Depth of fill (D) must be less than $B/2$ (where B = total opening).
2. Total Opening of 8 feet or more.



3. If the criteria does not meet items 1 and 2 above, the structure is considered to be a maintenance structure. It is the responsibility of the maintenance office in that area to inspect and maintain.
4. The Team Leader that determines that a structure is now a maintenance responsibility shall ensure that this information is passed on to the proper contacts.

Appendix 3-B UBIT Inspections and Procedures

The following explains the procedures for UBIT inspections.

1. **Determine Those Bridges Which Will Require Inspection With a UBIT** – On some structures, the team leader will not be able to gain sufficient access to determine the structural condition of the member (for example, floorbeam and stringer connections, a pier cap, or a bearing device at midspan or on top of interior piers that are too high for ladders). If this is the case, a UBIT, ladder, scaffolding, catwalk, boat, or some other means may be required to provide sufficient access.

The records for all structures that require inspection with a UBIT are all contained within the State Bridge Inventory. As part of scheduling for an upcoming inspection season, lists are generated from the inventory for bridges that are due for inspection with a UBIT.

2. **Provide for the Use of the UBIT** – The UBIT is an expensive piece of equipment and only a few agencies have the budget to purchase one. Along with the State, there are only a few UBIT owners in the Pacific Northwest. These trucks are complicated pieces of equipment which require special expertise to operate and a trained UBIT driver to drive and maintain the truck.
3. **Conduct the UBIT Inspection** – The UBIT inspection gives “hands on” access to under bridge elements for inspection. The team leader should make the same observations and assessments as would be made during a routine inspection. Given the expense of contracting for the use of this equipment, special care should be taken to ensure that the UBIT inspection is performed efficiently.

It is a good idea to map out an inspection plan that will allow an inspection of the entire under portion of the bridge in as few steps as possible and with as few changes in the positioning of the UBIT as needed. Communication between the inspection team in the bucket and the truck operator should be maintained at all times to ensure the safety of the operation and to allow for proper positioning for the inspection. The team should have any and all inspection equipment required (test hammer, note pad, camera, etc.). Finally, the team leader should ensure that needed traffic control can be provided and that all other necessary special equipment will be available. If these steps are taken, the UBIT inspection can be accomplished quickly and at minimum expense.

4. **Record the Inspection Findings on the Bridge Inspection Report** – The UBIT inspection findings should be recorded on the Bridge Inspection Report. Follow the same procedures as described for Routine Inspection Reports in Section .
5. **Updating the WSBIS Inventory Record** – Any other changes needed for the WSBIS Inventory Record (add the inspection date for UBIT, Fracture Critical, and/or Special Inspections) should be entered into BridgeWorks.

6. **Frequency** – The NBIS does not give specific instructions of how often a routine UBIT inspection needs to be completed. To determine the frequency necessary, a history of the bridge condition and deterioration needs to be established. After a few Routine UBIT Inspections are completed the history and deterioration can be determined. For those bridges that do not need a UBIT Routine Inspection each time, the inspection frequency can be rotated. For a “rule of thumb,” the state of Washington has chosen the following:

Type of Structure	Frequency (Months)
Timber	24
Steel Trusses	24
Steel Bridges With Pins and Hangers	24
Non-Fracture Critical Steel Bridges	48
Concrete Bridges With Movable Bearings in the Interior Spans	48
Concrete Bridges With Fixed Bearings or No Bearings; Maximum	72

7. **Traffic Control** – A UBIT inspection will typically require some sort of traffic control where a temporary work zone such as closing a lane of traffic or equivalent shoulder width is set up to provide safety for the inspection team as well as the traveling public. The traffic control plan needs to follow the updated version of the Manual of Uniform Traffic Control Devices (MUTCD) for proper signing and flagging in the temporary work zone. Local events and traffic disruptions need to be checked before scheduling a UBIT Truck. Emergency response agencies, schools, the public, and businesses affected by the inspection need to be notified so they can adjust as necessary. All these items need to be checked before committing to the actual inspection date.
8. **Fall Protection Plans** – The Department of Labor and Industries (L&I) and the Washington Administrative Code (WAC) require a Fall Protection Plan be completed at each UBIT Inspection site. The retrieval systems and the safety emergency plans need to be known and signed on the Fall Protection Form by all in the work zone prior to beginning the inspection. The State utilizes a Pre-Activity Safety Plan (PASP) prior to all inspections, see Section 3-5 for a copy of the PASP.



**Washington State
Department of Transportation**
Sid Morrison
Secretary of Transportation

Transportation Building
P O. Box 47300
Olympia, WA 98504-7300

July 28, 1998

Mr. Gene Fong
Division Administrator
Federal Highway Administration
711 South Capitol Way
Olympia, WA 98501

Attn: Mr. Barry Brecto

RE: Bridge Inspection Frequency
Revision

Dear Mr. Fong:

This is in response to your letter of May 7, 1998. Attached is a revised list of bridges that meet our approved 48-month inspection criteria. We have reviewed the current database and have excluded those bridges with spans of more than ~~30-48~~ ^{100 feet} meters.

We have changed the inspection frequency to 48 months on the 233 bridges on this list. The extended inspection frequency will be re-evaluated during every future inspection. We will continue to monitor the 48-month inspection criteria and submit an updated list every April along with our annual master list update.

Again, this is the criteria used to create and maintain the 48-month bridge inspection list.

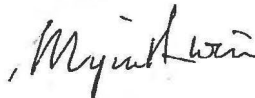
1. Common Designs - Concrete Bridges or steel culverts
 - a. Prestressed girders (PCB)
 - b. Box girders (CBOX)
 - c. Slabs (CS)
 - d. T-beams (CTB)
 - e. Post-tensioned box girders (PBOX)
 - f. Concrete culvert (CCULV)
 - g. Steel culvert (SCULV)

Mr. Fong
July 28, 1998
Page 2

2. Structure Age - No maximum age limit. The condition ratings will be used to determine whether the structure should be on a four-year cycle.
3. Condition Ratings
 - a. Superstructure greater than 6
 - b. Substructure greater than 6
 - c. Deck greater than 6
 - d. Culvert greater than 6
4. Inventory Load Ratings
 - a. ~~All bridge inventory ratings are greater than or equal to state legal loads~~
Inventory Rating Tons are equal to or greater than 36 or Rating Factor greater than 1.0
5. Vertical Underclearances greater than 14' 00"
6. Bridges over water
 - a. Not scour critical - Scour Code 5, 8, 9, T or N. 680
 - b. Channel and channel code 6 or greater. 677
7. The maximum span length is equal to or less than 100 feet (In Accordance with FHWA Technical Advisory T 5140.21 dated September 16, 1988).
8. The maximum ADT is 100,000 vehicles and the ADTT 10,000.
9. No major maintenance has been performed on the bridge in the last two years.
10. The bridge has received at least one in-depth inspection in addition to its inventory inspection.

We appreciate the effort and assistance that the FHWA Division Bridge Engineer has provided in this matter. We have implemented this change and will continue to monitor the status of the criteria you set forth. If you have any questions, please call the Bridge Preservation Engineer at (360)753-4739.

Sincerely,



M. MYINT LWIN, P.E.
Bridge and Structures Engineer

MML:lr
ORG/RPH
Attachment

cc: D. K. Nelson, EESC, MS 47323



U.S. Department
of Transportation

**Federal Highway
Administration**

Washington Division

Suite 501 Evergreen Plaza
711 South Capitol Way
Olympia, Washington 98501-1284
(206) 753-9480
(206) 753-9889 (FAX)

February 17, 1993

HBR-WA/407.23

Mr. Duane Berentson
Secretary of Transportation
Department of Transportation
Olympia, Washington

Attention: Mr. Al Walley, PE

Bridge Special Feature Inspections

Dear Mr. Berentson:

Enclosed for your information and use is a memorandum from our Region 3 office, which lists criteria for selecting bridges that have special features needing inspection. The designation of these features is contained in Items 92C and 93C of the National Bridge Inventory. This guidance is provided to promote some uniformity in compiling the lists for these bridges.

The special features inspection list you furnished our office in January 1992 consisted of the following bridge types.

- Movable Bridges
- Floating Bridges
- Suspension Bridges
- Segmental Bridges
- Ferry Terminals
- Bridges with A514 Steel
- Bridges with Pins and/or Hangers
- Bridges with Temporary Supports

Please review the criteria developed in Region 3 to determine if modifications should be made to your criteria. We recommend you give serious consideration to adding two items, cable stayed bridges and bridges experiencing fatigue cracking or scour problems, to your list.

Please provide us an up-to-date list of those bridges with special features requiring inspection, including the selection criteria. This submission should be included with the upcoming April

(more)

progress update on the NBIS Critical Feature Inspections, due in our office by March 24, 1993. Since this information is needed for both State and local agency bridges, we are providing Mr. Dennis Ingham a copy of this letter.

Sincerely,

BARRY F. MOREHEAD
Division Administrator



By: Barry B. Breto, P.E.
Division Bridge Engineer

Enclosure



U.S. Department
of Transportation
Federal Highway
Administration

Memorandum

Subject: National Bridge Inspection Standards (NBIS)
Guidance on Coding Items 92C and 93C in the National Bridge Inventory Date: November 13, 1992

From: Director, Office of Structures
Baltimore, Maryland

Reply to
Attn. of: HST-03

To: Division Administrators
Region 3

As discussed at our Region 3 Bridge Engineers meeting in Atlanta, we have been reviewing States' criteria for coding items 92C and 93C in the National Bridge Inventory (NBI). Item 92C refers to special features other than fracture critical details and underwater inspection which need special evaluation. Item 93C is for coding the date of last inspection of the special feature.

As anticipated, we found a wide variation in the definition of special features. In some cases, the items were obviously coded incorrectly or not coded at all. The variation in coding is due primarily to the lack of specific guidance on types of bridges that would require "other special inspection." Development of specific criteria has generally been left up to each individual State.

Several FHWA documents provide examples of special features or attempt to broadly define bridges that require special inspections. Examples are as follows:

- * Technical Advisory (TA) 5140.21, defines bridges with special features as those that by their nature or experience need special monitoring and evaluation. A second definition is provided in the same TA as bridges that because of location, strategic importance, or special design features, warrant special attention.
- * 23 CFR, Part 650, defines bridges with unique or special features as those which require additional attention during inspection to ensure the safety of such bridges.
- * The 1988 Coding Guide provides an example of a special feature as temporary shoring that is being inspected on a six month interval.
- * The Bridge Inspector's Training Manual (May 1991) provides three examples of bridge types which feature special elements and require special inspection procedures: suspension, cable stayed, and segmental concrete bridges.

Since each State is required to maintain a master list of bridges that require special inspections, some uniformity in the criteria used to compile the lists should exist. We recognize that there will

be differences in criteria due to individual State experiences, location, design policies, limits of acceptable risk, etc.; however, there are basic bridge types and features that are common among most of the States.

Based on the above definitions and examples along with our review of criteria in use by some States, we offer the following as a suggested list of bridge types or features that may require a special inspection:

1. Segmental, cable stayed, suspension, and movable bridges
2. Pin and hanger details on redundant structures.
3. Temporarily supported bridges
4. Bridges experiencing fatigue cracking or scour problems
5. Damaged bridges (e.g., due to vehicular or ship impact)
6. Concrete bridges showing signs of distress for which plans are not available
7. Interim inspection of bridges posted at operating rating
8. Long span metal culverts/structural plate culverts

With respect to movable bridges, inspection of the trusses, floor systems, and other structural elements requires typical inspection procedures; however, the electrical, mechanical and some structural components must receive a specialized inspection. Also, long span metal culverts are included on the list based on problems with cracking along the bolt line experienced by some States.

A few States use additional criteria such as bridges with steel box girders, electroslag welds, post-tensioned concrete channel beams, and panel type bridges (e.g., Acrow, Mabey, Bailey). These are good examples of features that may be specific to an individual State based on local experience.

We should note that a bridge does not have to be inspected more frequently than every two years to be included on the master list for item 92C. The "individual in charge" of a State's inspection program is responsible for determination of time intervals between inspections based on the condition of the special feature or bridge. More frequent inspection should not be used as a crutch in lieu of repair or retrofit. When used for this purpose it should be a temporary measure where deficiencies can be corrected and considered as a deliberate measure where corrections are impractical. The attached December 20, 1990 Washington Office memorandum provides additional guidance on inspection frequency.

We request that each Division Bridge Engineer review their States practices for coding items 92C and 93C with consideration given to the above suggested criteria. Where appropriate, changes or additions to the State's current criteria should be pursued. For those States that have either not coded these items or have coded them incorrectly, measures should be implemented to ensure accurate reporting in the NBI.

3

We further request that a brief status report be provided to our office by December 31, 1992. The report should indicate where your State stands in relation to our suggested criteria and outline any proposed actions to implement necessary changes. We are available to assist in this effort if desired.

Please contact Mr. Thomas Everett at 410-962-2486 with any questions or comments.


Louis N. Triandafilou

Attachment

List of WSDOT Elements by Number

Bridge Decks	
12 Concrete Deck	4-13
13 Bridge Deck Surface.	4-14
14 Fully Supported Concrete Deck	4-14
15 Post Tensioned Concrete Deck.	4-15
20 Concrete Deck - Lightweight Aggregate.	4-15
26 Concrete Deck w/Coated Bars.	4-16
27 Steel Orthotropic Deck	4-16
28 Steel Deck - Open Grid	4-16
29 Steel Deck - Concrete Filled Grid.	4-16
30 Deck - Corrugated or Other Steel system	4-17
31 Timber Deck	4-17
32 Fiber Reinforced Polymer (FRP) - Deck.	4-17
35 Concrete Deck Soffit	4-18
36 Deck Rebar Cover Flag.	4-18
Superstructure	
38 Concrete Slab	4-20
49 Concrete Hollow Slab.	4-20
50 Prestressed Concrete Slab.	4-20
51 Prestressed Concrete Slab w/Coated Bars.	4-20
52 Concrete Slab w/Coated Bars.	4-21
54 Timber Slab	4-21
89 Prestressed Concrete Girder w/Coated Strands	4-22
90 Steel Rolled Girder	4-22
91 Steel Riveted Girder	4-22
92 Steel Welded Girder.	4-23
96 Concrete Encased Steel Girder.	4-23
97 Prestressed Concrete Trapezoidal Girder	4-24
98 Thin Flange Girder	4-24
100 Post Tensioned Concrete Segmental Box Girder	4-25
102 Steel Box Girder	4-25
103 Prestressed Concrete Super Girder	4-26
104 Post Tension Concrete Box Girder.	4-26
105 Concrete Box Girder.	4-26
107 Steel Open Girder.	4-27
108 Prestressed Concrete Bulb-T Girder	4-27
109 Prestressed Concrete Multiple Web Girder Units	4-28
110 Concrete Girder.	4-28
111 Timber Glue-Lam Girder	4-28
113 Steel Stringer.	4-29
114 Concrete Multiple Web Girder Unit.	4-29
115 Prestressed Concrete Girder.	4-29
116 Concrete Stringer	4-30
117 Timber Sawn Girder	4-30
118 Timber Stringer	4-30
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135 Timber Truss	4-32
139 Timber Arch.	4-33
141 Steel Arch.	4-33
142 Steel Tied Arch	4-33
143 Steel Suspender	4-34
144 Concrete Arch	4-34
145 Earth Filled Concrete Arch	4-35
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154 Prestressed Concrete Floor Beam	4-37
155 Concrete Floor Beam	4-38
156 Timber Floor Beam.	4-38
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204 Prestressed Concrete Pile/Column	4-46
205 Concrete Pile/Column	4-46
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207 Concrete Pile/Column w/Steel Jacket.	4-47
208 Concrete Pile/Column w/Composite Wrap ...	4-48
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213 Other Submerged Pier Wall	4-49
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218 Steel Abutment	4-51
219 Concrete Cantilevered Span Abutment.	4-52
220 Concrete Submerged Foundation	4-52
221 Concrete Foundation	4-53
222 Timber Foundation	4-53
225 Steel Submerged Pile/Column	4-54
226 Prestressed Concrete Submerged Pile/Column	4-54
227 Concrete Submerged Pile/Column	4-54
228 Timber Submerged Pile/Column	4-55
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233 Prestressed Concrete Pier Cap/Crossbeam ..	4-56
234 Concrete Pier Cap/Crossbeam.....	4-57
235 Timber Pier Cap	4-57
236 Concrete Floating Pontoon.....	4-58
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243 Other Culvert	4-63
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312 Concealed Bearing or Bearing System	4-66
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369 Seismic Pier Infill Wall	4-73	400 Asphalt Butt Joint Seal	4-80
370 Seismic - Longitudinal Restrainer	4-75	401 Asphalt Open Joint Seal	4-80
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403 Concrete Bulb-T	4-81	414 Bolt Down - Sliding Plate w/springs	4-85
404 Compression Seal/Concrete Header	4-82	415 Bolt Down Panel - Molded Rubber	4-86
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20 Concrete Deck - Lightweight Aggregate	4-15
26 Concrete Deck w/Coated Bars	4-16
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28 Steel Deck - Open Grid	4-16
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30 Deck - Corrugated or Other Steel system	4-17
31 Timber Deck	4-17
32 Fiber Reinforced Polymer (FRP) - Deck	4-17
35 Concrete Deck Soffit	4-18
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407 Steel Angle Header	4-83
408 Steel Sliding Plate	4-83
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262 Corrugated/Orthotropic Sidewalk and Supports	4-64
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208 Concrete Pile/Column w/Composite Wrap	4-48	370 Seismic - Longitudinal Restrainer	4-75
209 Submerged Concrete Pile/Column w/Steel Jacket	4-48	371 Seismic - Transverse Restrainer	4-75
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49 Concrete Hollow Slab	4-20	119 Concrete Truss	4-31
52 Concrete Slab w/Coated Bars	4-21	144 Concrete Arch	4-34
96 Concrete Encased Steel Girder	4-23	145 Earth Filled Concrete Arch	4-35
105 Concrete Box Girder	4-26	150 Concrete Column on Spandrel Arch	4-15
110 Concrete Girder	4-28	155 Concrete Floor Beam	4-38
114 Concrete Multiple Web Girder Unit	4-29		

Prestressed Concrete

50 Prestressed Concrete Slab	4-20	103 Prestressed Concrete Super Girder	4-26
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4-1 Introduction

This chapter defines the Washington State Department of Transportation (WSDOT) elements for recording the structural condition evaluation of bridges. Local Agencies are encouraged, but not required to use the WSDOT Bridge Elements as defined in this chapter in order to use WSDOT management strategies and lessons learned. The basic intent of any element data is to supplement the National Bridge Inventory (NBI) structural evaluation of the Deck, Superstructure, and Substructure. Most of the other NBI information such as location, traffic, and geometry is still useful, but element conditions are a practical necessity to identify and manage bridge needs.

Though the NBIS did provide a consistent standard for the collection of bridge data, it was not comprehensive enough to provide performance-based decision support that included economic considerations. Among the problems with the NBIS are:

- Each bridge is divided into only three major parts for condition assessment: superstructure, substructure, and deck. This level of detail is not sufficient to identify appropriate repair strategies, or to estimate costs.
- Each of the three major parts was rated on a 0-9 scale by severity of deterioration, without identifying the deterioration process at work or the extent of deterioration.
- NBI condition ratings vary based on the vague language of the condition definitions. Because the bridges include multiple distress symptoms and ratings to describe the overall or “average” condition of the bridge, is often difficult to decide what the “average” condition is when a bridge has mainly localized problems.
- NBI does not provide a method to inspect or track the performance of items such as paint, overlays, and expansion joints.

WSDOT recognized a different strategy towards future bridge preservation was needed in the early 1980's. A comprehensive deck testing program existed at the time and obviously the testing should have a connection to the NBI deck condition rating. WSDOT elements have been in use since 1992 and were designed to be practical for the inspector, useful to a bridge manager, and accurately capture bridge conditions. WSDOT elements have matured since 1992 and so have the national element philosophies:

- 1985 – NCHRP Project 12-28: Bridgit and Pontis Management software
- 1987 – NCHRP Report 300: Element based Bridge Management System (BMS)
- 1993 – FHWA CoRe Element Report recommendations
- 1996 – AASHTO CoRe Element Guidelines adopted
- 2011 – AASHTO Guidelines for Bridge Element Inspection
- 2014 – FHWA requirement to collect element level bridge inspection data for NHS bridges.
- 2015 – As a supplement to the National Bridge Inventory (NBI) data submission due April 1, 2015, and every year thereafter, each State and Federal agency will also provide element level bridge inspection data for bridges on the NHS to the FHWA for inclusion in the NBI. Today, a successful Bridge Management System must use supplemental bridge condition data to ensure the effective use of available funds. WSDOT element data has supported WSDOT Bridge needs with minor changes since the year 2008 in the follow ways:
 - Element data is used to identify current bridge condition, need, and cost.
 - Provided a logical and realistic method to prioritize bridge projects.

- Realistic and reliable forecasts of future preservation need and cost.
- Adapted changes in management philosophies without changing elements.
- Tracks the performance of desired bridge needs.

Elements represent parts of a structure that are relevant to document structural conditions with clearly defined condition states or to manage. Elements that carry primary design loads are considered structural elements and all follow the same condition state philosophy.

“Smart Flags” are elements used to track supplemental information that may or may not be included in other elements or exist at the time of original construction. Smart Flag condition states are defined as necessary to collect useful information and may be significantly different than other element definitions. Examples of Smart Flags are Steel Fatigue (cracks in steel elements), Scour, and Pack Rust.

WSDOT elements presented herein are used by both the WSDOT Bridge Office and Local Programs (LP). Local Agencies are encouraged to follow these guidelines so as to provide a consistent basis for management, evaluation, and reporting of inspection data.

4-1.1 Identifying Elements Prior to Inspection

Details about the design of the bridge are important when identifying the elements. As-built plans should be used to determine the correct elements, and then field verified during the inspection. If as-built plans are not available, then the elements will have to be defined or assumed at the bridge site. Many of the element dimensions for the element total quantity are difficult to determine in the field and it is highly recommend the total quantities be calculated based on contract plan dimensions.

For example, looking at the contract Plans is the only practical way to determine if a bridge deck has plain reinforced steel which is element 12, or epoxy coated steel which is element 26 because this information is not visible to the inspector. Likewise, field measuring the deck length and width in traffic would not be necessary and usually less accurate than if plan dimensions are available.

An average bridge made of the same material will have six to ten elements. A large or complex bridge may have up to 20 elements. A typical bridge will have a bridge deck, possibly a deck overlay, bridge rails, a primary load carrying member like a prestressed concrete girder, primary substructure support like concrete columns, other elements like abutments, expansion joints and/or bearings.

In order to maintain quality element data, the Inspector is responsible for updating the elements and quantities as they change with time by maintenance or by contract. Many bridges will have construction work that changes the joints, asphalt depth, rail, concrete overlay, or widens the structure, etc. These activities can change elements that apply to the bridge and must be updated accordingly. WSDOT uses a Contract History database to log contract work and for reference. See Section 2-2 for more information on the Contract History database.

4-1.2 Element Units and the Total Quantity

Every element has assigned units that are necessary for the inspector to quantify the element defects. The units are “SF” for Square Feet, “LF” for Lineal Feet, “EA” for Each, or in the case of concrete pontoons the units are per Cell.

“SF” units apply to elements where the surface area provides the better method to document element condition and manage the element, such as deck and paint elements.

The total quantity for an element with “LF” units should represent the total length of an element and is based on the way it was constructed. For example: A bridge may have been built using five “Prestressed Concrete Girders.” Each one was individually pre-cast and then put into place at the bridge site. If each girder were 100 feet in length then the total element quantity would be “500 LF.” If the same bridge was a “Concrete Box Girder” then the total quantity would be “100 LF” since the box girder was constructed as one unit.

“EA” units are used to determine the number of members in a condition state. For example: A bridge may 5 piles at 3 piers for a total quantity of 15 for the pile element. Then, each pile is inspected, evaluated, and recorded in the appropriate condition state. Elements with units of “EA” code the entire member in one condition state, such as piles, where the entire pile is in one of the defined condition states. Other element units, such as “LF” or “SF” may have all or portions of the element in one or all of the condition states in order to describe the existing element conditions.

4-1.3 Quantifying Element Defects

In order to quantify the condition of an element, the first step is to review the condition state language for the elements. A complete list of the condition state descriptions is provided in this chapter and summarized in this section.

Element condition state (CS) language is based on four condition states for all primary structural members, regardless of the materials. Similar to the NBI system of evaluation, element condition requires the inspector to evaluate defects and also quantify the defect’s impact to the element or possibly the bridge. A defect evaluation may result in element quantities in CS1, CS2, CS3, or CS4 depending on the location, size, structural importance or element units.

4-1.3.A Affected Quantity

The concept of the “Affected quantity” is relied on heavily when quantifying the defects in the primary structural elements and should be applied in two ways. Condition State 3 defines “Affected Quantity” of the defect as local damage to a member and the “Affected Quantity” is the actual length of the defect. Whereas, Condition State 4 defines “Affected Quantity” as a reduced capacity of the member and the “Affected Quantity” is the length of the span. In the case of prestressed girders, damage that does not “Affect” capacity of a prestressed girder would only quantify the length of damaged concrete in CS3. Whereas, Condition State 4 does “Affect” the capacity of the girder and the quantity is the span length, not just the length of damaged concrete. Using this same rational to quantify repairs in CS2, a patch that covers damage to the concrete only is quantified as the length of the visible patch and a patch that covers repaired strand is quantified as the span length in CS2. In other words, the patch is quantified in CS2 based on the “Affected length” of the damage.

This philosophy applies directly to all beam type elements including concrete slab structures with side-by-side beam elements using square foot quantities. It is less obvious where there can be significant redistribution of stresses such as a timber deck or cast-in-place concrete slab. In these cases a defect, such as a hole in the deck, would have to be evaluated as to whether the capacity of the span is “Affected” or not. Trusses are the most difficult because the linear feet quantities represent a 3 dimensional member with chords, verticals, horizontals, sway bracing, etc. Trusses should quantify CS3 defects by panel length of truss and CS4 truss capacity defects by span length of the truss.

4-1.3.B WSDOT Condition States for Structural Members

The following summarizes the WSDOT element condition state philosophy for primary structural members. Different condition philosophies apply to the non-primary structural elements such as deck/overlays, joints, paint, and smart flags which are specified for each element in Chapter 4, but not discussed in this section.

Condition State 1: Good Condition – Most parts of a bridge will be in this condition state for all WSDOT elements. The element may have some defects, but is in good condition. Many times new bridges have insignificant defects and older bridges will acquire insignificant defects with time. In order to determine if the defect is insignificant, the inspector must decide if the defect will impact the element load carrying capacity with time. Inspectors are cautioned to look at new construction that may not be CS1.

Condition State 2: Repaired Condition – This condition state documents repairs to structural members. A repair is defined as a defective member partially modified to carry design loads and still dependent on the remaining portions of the defective member, such as an in-span splice, helper member, or column splice. Generally, these are easy to identify and report. Common repairs do not have the same integrity or longevity as original construction. Many times members are difficult to access and prohibit a good quality repair. Inspectors are cautioned to verify repairs to make sure they are functioning as intended. When a damaged or defective member has been entirely replaced, the member quantity is CS1 or considered a new member. If a repair is not completed correctly or is not functioning properly, then the repair should be coded as CS3 or CS4. For example:

- A timber helper stringer/pile that does not properly transfer design loads is not considered sufficient to be considered in CS2. A repair must properly block, brace, or connect to the stringer/pile as required by repair design.
- Timber pier caps are assumed to be designed as simple spans. Even though the member that has been partially replaced is not continuous at a support, as long as there is a positive connection to the supporting columns, the replaced portion may be considered in CS1.

The amount of repaired quantity to be coded in CS2 depends on the affected length of the repair for all primary structural members. In general terms, the quantity to be coded in CS2 is the quantity that was in CS3 or CS4 and is now repaired. For example:

- A prestressed girder with a high load hit that did not damage strand would code the length of the concrete patch as the repair quantity for CS2. If a strand is damaged, then the span length is the repair quantity for CS2.
- A repaired crack in a steel member that did not threaten capacity would code the minimum length or 1 foot for CS2. If the repaired crack did threaten capacity, then the span length is the repair quantity for CS2.

Condition State 3: Fair Condition – This condition state records any significant defect noticed by the inspector, but the defect does not significantly impact the capacity of the element. Capacity is not currently threatened, but if left unchecked, it could be threatened in the future. Repairs may apply to the elements in CS3 because the defects are more economical address now than to wait and repair later.

Condition State 4: Poor Condition – This condition state documents members with defects that have impacted the structural capacity of the element. Based on the visual inspection, the owner of the bridge must address this deficiency in order to preserve or restore the capacity of the member and/or structure. Generally, these defects have reduced the structural capacity of the element, but are still within safe operating limits of design.

4-1.4 **Reporting Structural History**

There are times when structural information may be known but not visible; or visible and then at a later time not visible to the inspector. This can happen to submerged piles/foundations that are buried one inspection and exposed the next. This also applies to asphalt overlays where the deck patching is not visible to the inspector. This type of element information should remain in the element notes until the element condition is known to have changed. An example of element change would be deck delaminations recorded in CS4 are not visible to the inspector and are removed by hydromilling during construction of a concrete overlay. The CS4 data does not apply after the concrete overlay is completed and WSDOT element 376 should be deleted from the report and the concrete deck CS4 quantity should be zero.

4-1.5 **Concrete Element Cracking**

The following table is reproduced from the Bridge Inspector's Reference Manual (BIRM), Volume 1, Table 2.2.3; and should be used to distinguish between different sizes of concrete cracks.

Exhibit 4-1 WSDOT Element Concrete Crack Width Guidelines

	Reinforced Concrete		Prestressed Concrete	
	English	Metric	English	Metric
Hairline (HL)	< 0.0625"	< 1.6 mm	< 0.004"	< 0.1 mm
	< 1/16"			
Narrow (N)	0.0625" to 0.125"	1.6 to 3.2 mm	0.004" to 0.009"	0.1 to 0.23 mm
	1/16" to 1/8"			
Medium (M)	0.125" to 0.1875"	3.2 to 4.8 mm	0.010" to 0.030"	0.25 to 0.75 mm
	1/8" to 3/16"			
Wide (W)	> 0.1875"	> 4.8 mm	> 0.030"	> 0.76 mm
	> 3/16"			

Concrete Structural Cracking – For the purpose of evaluating element condition, concrete structural cracks are narrow (or wider) in regions of high shear or moment (see BIRM). Crack width is significant to the extent that it indicates exposure of rebar to water and/or a structural problem in a concrete element. Generally, most concrete elements have hairline cracking and not considered significant structurally.

4-1.6 **WSDOT Deck Element to NBI Deck Table**

WSDOT began testing concrete decks in the early 1980s and discovered a very poor correlation to the traditional assumptions of deck deterioration. In addition, the deck testing and crack surveys did not prioritize deck preservation projects in a fashion acceptable to the inspectors, maintenance, or management. Today, WSDOT recommends the use of the deck and soffit elements and Table 4.1.6 to evaluate the NBI Item 058, NBI Deck Overall Condition Code. This table originates from the 1973 FHWA Coding Guidelines and has been modified to reflect WSDOT's primary bridge deck management philosophies since the early 1990s.

Secondary and more subjective concrete deck conditions such as cracking, scaling, leaching, rebar cover, chloride content, Half-cell potential, etc. may be documented in the deck element notes, but not applied to the deck element evaluation of structural condition. These secondary conditions are applied during annual prioritization of the concrete bridge decks and should not determine the NBI code. To be clear, these types of secondary conditions visible below the deck in the soffit or other structural elements below the deck element require an evaluation of:

Exhibit 4-2 WSDOT Deck Condition to NBI Deck Overall

Percent of Concrete Deck Patches, Spalls, and Delaminations (CS2 + CS3 + CS4)	Percent of Concrete Deck Soffit in CS3 (CS3 only)	NBI Deck Condition Code
N/A	N/A	9
None	None	8
None	None	7
< 1%	< 1%	6
1% to 2%	1% to 2%	5
2% to 5%	2% to 5%	4
> 5%	> 5%	3

4-2 Bridge Decks

The intent of the bridge deck elements is to record the top surface deterioration. The Concrete Deck Soffit, slab, or deck-girder elements record the structural deterioration. Deck elements 12, 13, 14, 20, and 26 record deck patches in CS2, deck spalls in CS3, and delaminations in CS4. Other deck top surface distress such as cracking, scaling, and rutting are not tracked in the deck BMS condition states. These items should be described in the notes at the inspector's discretion. Do not count filling in of the rut as a patch. These locations have filled in a rut with Liquid Concrete or Ure-Fast and are not considered a deck structural repair.

All asphaltic patching material on a concrete bridge deck shall be considered a spalled area and since this is unacceptable patching material. These materials can be picked out of the spall and will smell like tar.

All bridges will have at least one deck element, even though some bridges do not have a traditional deck and use elements 13 or 14. (The one exception is a Luten Arch structure that is earth filled with an asphalt pavement only.)

Traditional concrete bridge decks use elements 12, 20, or 26 to record the top surface deterioration; and have the WSDOT Soffit Element (35) to record the structural deterioration. It should be noted for element 26 that epoxy coated rebar in bridge decks became an industry standard in Washington State in the early 1980s.

Non-Traditional concrete decks use elements 13 or 14 to record the top surface deterioration and the slab or deck-girder elements record the structural deterioration.

Steel and Timber decks use elements 28, 29, 30, 31 to record structural deterioration of the top and bottom surface.

Inspectors are encouraged to take the time to locate and describe the patches and spalls on larger structures using photos and descriptions. The preferred documentation format for patching is the number and SF per span. This format is easiest for the next inspector to identify quantity changes.

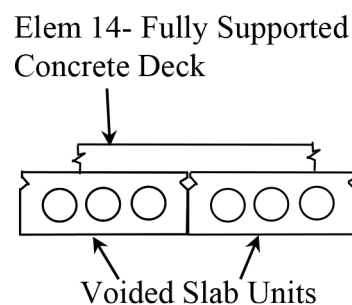
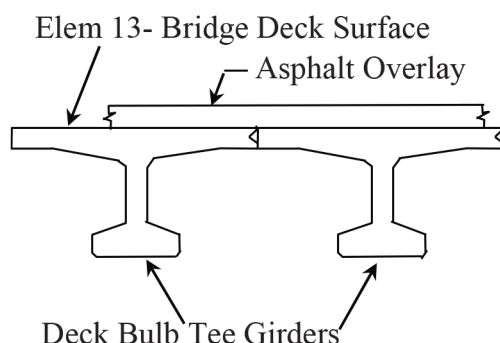
Quantity estimates must be based on the sum of the estimated length and width of the patched or spalled areas. Approximations based on the percent of area are not useful.

Note: The total quantity for deck elements is the actual bridge deck area. Do not use the NBI Item 051, “**Bridge Roadway Width Curb-to-Curb**” (or WSBIS Item 1356 “**Curb-to-Curb Width**”) when deck curb-to-curb dimensions vary.

12	Concrete Deck	Units - SF
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This element defines a concrete bridge deck constructed with uncoated steel reinforcement. The total quantity for this element is the actual bridge deck area from curb line to curb line.

1. Defects are superficial. The deck surfaces have no spalls/delaminations or previous repairs. The deck surfaces may have hairline cracks or rock pockets. Wear and rutting may expose aggregate or reinforcing.
2. Deck area with repairs or patches. Do not include the rare case rutting filled with patching material.
3. Deck area with spalling. Do not add delaminations found in the field, see condition State 4.
4. Record the delaminated area (CS4) from WSDOT element 376 in the deck CS4. If new delaminations are found, do not add delaminations found in the field unless approved by Bridge Management. Chain Drag testing by the Bridge Inspector must chain the entire deck, record the results in a Chain Drag Report available on the Bridge Website under Bridge Overlays, and send the file to Bridge Management.



13	Bridge Deck Surface	Units – SF
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This WSDOT element defines a surface of a bridge deck that consists of a slab or girder without a traditional deck. Usually there is a deck protection system (overlay) present, but in some cases, traffic may be driving directly on the girder or slab. The Bridge Deck Surface consists of precast or prestressed girders with no span between the flanges. This WSDOT element is generally used with superstructure elements 38, 49, 50, 51, 52, 54, 108, 109, or 114. The total quantity for this element is the actual bridge deck area from curb line to curb line.

14	Fully Supported Concrete Deck	Units – SF
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This WSDOT element defines a fully supported concrete bridge deck constructed with one layer of coated reinforcement (epoxy, galvanizing, stainless steel, etc.). The bridge support surface consists of precast or prestressed girders with no span between the flanges. This WSDOT element may apply to superstructure WSDOT elements 50, 51, 108, 109, or 114. The total quantity for this element is the actual bridge deck area from curb line to curb line.

Condition States for WSDOT Elements 13 and 14

1. Defects are superficial. The deck surfaces have no spalls/delaminations or previous repairs. The deck surfaces have no exposed reinforcing. The deck surfaces may have hairline cracks, rock pockets and/or be worn exposing aggregate.
2. If the top of the slabs or girders are visible, area of deck with repairs.
3. Deck area with spalling. Do not add delaminations found in the field, see condition State 4.
4. Record the delaminated area (CS4) from WSDOT element 376 in the deck CS4. If new delaminations are found, do not add delaminations found in the field unless approved by Bridge Management. Chain Drag testing by the Bridge Inspector must chain the entire deck, record the results in a Chain Drag Report available on the Bridge Website under Bridge Overlays, and send the file to Bridge Management.

15	Post Tensioned Concrete Deck	Units – SF
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This element is defined by a concrete bridge deck that has transverse or longitudinal post tensioning; and includes the deck on elements 100 Post Tensioned Segmental and 104 Post Tensioned Concrete Box. These decks require a higher level of care for maintenance, special attention by management, and have a higher replacement cost. This element does not include the deck of elements 105 Concrete Box and 97 Trapezoidal. The total quantity for this element is the actual bridge deck area from curb line to curb line.

1. Defects are superficial. The deck surfaces have no spalls/delaminations or previous repairs. The deck surfaces may have hairline cracks or rock pockets. Wear and rutting may expose aggregate or reinforcing.
2. Deck area with repairs or patches. Do not include the rare case rutting filled with patching material.
3. Deck area with spalling. Do not add delaminations found in the field, see condition State 4.
4. Record the delaminated area (CS4) from WSDOT element 376 in the deck CS4. If new delaminations are found, do not add delaminations found in the field unless approved by Bridge Management. Chain Drag testing by the Bridge Inspector must chain the entire deck, record the results in a Chain Drag Report available on the Bridge Website under Bridge Overlays, and send the file to Bridge Management.

20	Concrete Deck – Lightweight Aggregate	Units – SF
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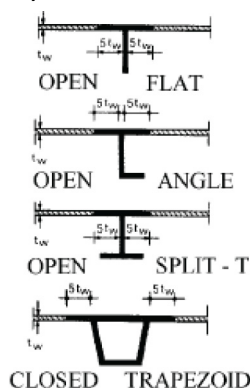
This WSDOT element defines a lightweight concrete bridge deck constructed with lightweight aggregate and steel reinforcement. The total design weight of the deck is approximately 120 lbs./C.Y. The total quantity for this element is the actual bridge deck area from curb line to curb line.

26	Concrete Deck w/Coated Bars	Units – SF
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This WSDOT element defines a concrete bridge deck constructed with coated (epoxy, galvanizing, stainless steel, etc.) reinforcement. The total quantity for this element is the actual bridge deck area from curb line to curb line.

Condition States for WSDOT Elements 20 and 26

1. Defects are superficial. The deck surfaces have no spalls/delaminations or previous repairs. The deck surfaces may have hairline cracks or rock pockets. Wear and rutting may expose aggregate or reinforcing.
2. Deck area with repairs or patches. Do not include the rare case rutting filled with patching material.
3. Deck area with spalling. Do not add delaminations found in the field, see condition State 4.
4. Record the delaminated area (CS4) from WSDOT element 376 in the deck CS4. If new delaminations are found, do not add delaminations found in the field unless approved by Bridge Management. Chain Drag testing by the Bridge Inspector must chain the entire deck, record the results in a Chain Drag Report available on the Bridge Website under Bridge Overlays, and send the file to Bridge Management.



27	Steel Orthotropic Deck	Units – SF
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This WSDOT element defines a bridge deck constructed of a flat, deck plate stiffened either longitudinally or transversely, or in both directions. See BIRM, Volume 1, Figure P.1.2.7 The total quantity for this element is the actual bridge deck area curb to curb.

28	Steel Deck – Open Grid	Units – SF
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This WSDOT element defines a bridge deck constructed of steel grids that are open and unfilled. The total quantity for this deck WSDOT element is the actual bridge deck area from curb line to curb line.

29	Steel Deck – Concrete Filled Grid	Units – SF
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This WSDOT element defines a bridge deck constructed of steel grids with either all of the openings or just those in the wheel lines filled with concrete. The total quantity for this element is the actual bridge deck area from curb line to curb line.

30	Deck – Corrugated or Other Steel system	Units – SF
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This WSDOT element generally defines a bridge deck constructed of corrugated metal filled with Portland cement concrete or asphaltic concrete. This element may also be used to identify other non-standard steel decks. The total quantity for this element is the actual bridge deck area from curb line to curb line.

Condition States for WSDOT elements 27, 28, 29, and 30 (Structural Decks)

1. Defects are superficial. The connectors (such as welds, rivets, etc.) or concrete/asphalt filler are functioning as designed.
2. Deck area with repairs or replaced panels.
3. Deck area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Deck area with damage in locations or quantity and has reduced the structural capacity of the element. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

31	Timber Deck	Units – SF
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This WSDOT element defines a bridge deck constructed of timber. The deck may be longitudinally or transversely laminated or of planks. The deck may have an overlay or may be constructed with runners of metal or timber. The total quantity for this element is the actual bridge deck area from curb line to curb line.

1. Defects are superficial and have no effect on the structural capacity of the element. Decay, insect infestation, cracks, splits, or checks may exist.
2. Timber deck area with repairs, plates, or replaced timbers.
3. Timber deck area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. These areas are typically marked with a YELLOW TAG by inspectors.
4. Timber deck area with damage in locations or quantity and has reduced the structural capacity of the WSDOT element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. These areas are typically marked with a RED TAG by inspectors.

32	Fiber Reinforced Polymer (FRP) – Deck	Units – SF
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This WSDOT element defines a bridge deck constructed of fiber reinforced polymer. The total quantity for this element is the actual bridge deck area from curb line to curb line.

1. Defects are superficial. Cracking or delamination of layers may be present.
2. FRP Deck area with repairs, patches, or plated.
3. FRP Deck area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. FRP Deck area with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

35	Concrete Deck Soffit	Units – SF
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This WSDOT element defines the bottom (or undersurface) and edge of a concrete deck and is to be included with concrete WSDOT deck elements 12, 20, and 26. It is extremely valuable when an asphalt overlay exists on the top surface of the deck. The purpose of the element is to identify decks that may have a reduced structural capacity through visual inspections of the deck soffit. Element 35 does not apply if steel stay-in-place forms are present since the soffit is not visible. To be consistent with the deck quantity, the total quantity for this element the actual bridge deck area from curb line to curb line. Delaminations on concrete soffits over roadways may pose a danger to traffic below the bridge. In this situation, a repair should be recommended to correct the condition.

1. The undersurface of the deck is not showing signs of distress. There may be rust stains from rebar chairs, spalls without exposed rebar, or cracks with efflorescence.
2. Deck soffit area with repairs or patches.



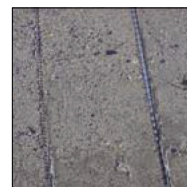
3. Deck soffit area showing signs of reduced structural capacity. Typical indications include areas with heavy to severe rust staining from deck reinforcement; Spalling with corroded rebar indicating active corrosion; Cracks that are full depth, severe, or leaking water.



36	Deck Rebar Cover Flag	Units – SF
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This does not apply to deck spalling with exposed rebar. This element is used to identify the top surface of bridge decks with concrete cover less than 1 inch and having rebar exposed. This condition results from either lack of cover during construction or general rutting that has exposed rebar. Deck patching is often difficult at these locations. This flag will determine method of deck rehabilitation. Report square foot of visible deficiency in CS2. The total quantity for this element is the actual bridge deck area curb to curb.

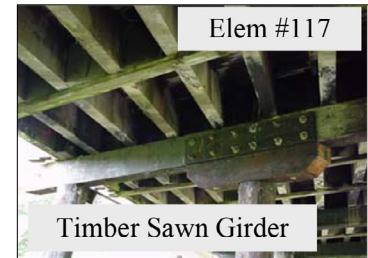
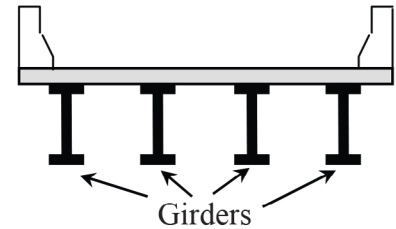
1. Deck top surface area with adequate concrete cover.
2. Concrete deck area with visible lack of cover due to construction or general rutting that has exposed rebar.



4-3 Superstructure

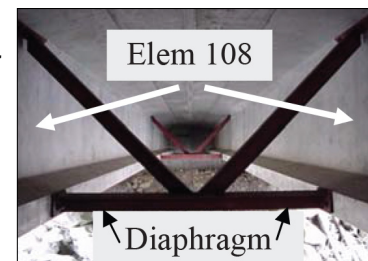
4-3.1 Girders

A girder is defined as any longitudinal structural member (single web or box section) that directly supports the bridge deck. A girder type bridge will typically have two or more girders. Girders may be constructed of the following typical materials: Rolled, welded, bolted (riveted), steel sections; Post tensioned, prestressed or reinforced concrete sections; or Timber sections.



4-3.2 Diaphragms

Diaphragms are structural members used to tie adjoining girders together to improve the strength and rigidity of the girder and to distribute forces in the lateral direction. Diaphragms do not have an element but if a diaphragm has advanced deterioration, it should be noted in the element comments of the associated girder.



4-3.3 Pedestrian Bridges

The same WSDOT elements used for bridges that carry vehicular traffic can be used for pedestrian bridges. Do not use the WSDOT sidewalk elements (#260 through #266) for pedestrian bridges.



4-3.4 Slab Bridges

Slab bridges can have precast segments or cast in place concrete. The bridge in the picture is a cast in place concrete slab and will have a deck element for the deterioration of the top surface. Structural deficiencies of the slab bottom and edge are documented in WSDOT element 38 "Concrete Slab."

Note: The total quantity for slab elements is the actual bridge deck area. Do not use the NBI Item 051, "Bridge Roadway Width Curb-to-Curb" (or WSBIS Item 1356 "Curb-to-Curb Width") when a deck curb-to-curb dimensions vary.

38	Concrete Slab	Units – SF
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This element defines a concrete slab bridge and edge that has been constructed with uncoated reinforcement. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this slab element is the actual bridge slab area from curb line to curb line.



49	Concrete Hollow Slab	Units – SF
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This element defines a concrete slab bridge and edge that has been constructed with sonotubes and uncoated reinforcement. Structural deficiencies of the edge and bottom surface are addressed in the condition states. This type of bridge was typically built in the 50's and 60's on the state highway system. The total quantity for this slab element is the actual bridge slab area from curb line to curb line.

50	Prestressed Concrete Slab	Units – SF
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This element defines a concrete slab bridge that has been constructed with prestressed concrete and uncoated steel reinforcement. This element may be solid or have built in voids. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this slab element is the actual bridge slab area from curb line to curb line.

51	Prestressed Concrete Slab w/Coated Bars	Units – SF
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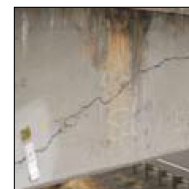
This element defines a concrete slab bridge that has been constructed with prestressed concrete and coated steel reinforcement (epoxy, etc.). This element may be solid or have built in voids. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this slab element is the actual bridge slab area from curb line to curb line.

52	Concrete Slab w/Coated Bars	Units – SF
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This element defines a concrete slab bridge and edge that has been constructed with coated (epoxy, etc.) reinforcement. This element may or may not contain a hollow core. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this slab element is the actual bridge slab area from curb line to curb line.

Condition States for WSDOT Elements 38, 49, 50, 51, and 52

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Concrete slab area with repairs or patches.
3. Concrete slab area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Concrete slab area with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. For slabs made with beam units, the affected area should be based on the span length.



54	Timber Slab	Units – SF
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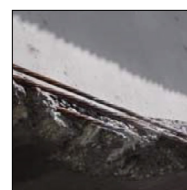
This element defines a slab that is constructed of timber. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this slab element is the actual bridge slab area from curb line to curb line.

1. Defects are superficial and have no effect on the structural capacity of the element. Decay, insect infestation, cracks, splits, or checks may exist.
2. Slab area with repairs, plates or replaced timbers.
3. Slab area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. These areas are typically marked with a YELLOW TAG by inspectors.
4. Slab area with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. These areas are typically marked with a RED TAG by inspectors.

89	Prestressed Concrete Girder w/Coated Strands	Units - LF
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This element defines a girder constructed of precast prestressed concrete and epoxy coated strand that supports the bridge deck. The element quantity should equal the sum of each girder length. The element total quantity for this element is the sum of each girder length.

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Girder length affected by repair or patch. Capacity repairs such as a strand splicing should record girder span length.
3. Girder length affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.
4. Girder span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.



90	Steel Rolled Girder	Units - LF
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This element defines a girder unit of structural steel that has an integral web and flanges and was fabricated in a steel mill by the rolling process. This element may have bolted, riveted or welded cover plates. This element directly supports the bridge deck and is part of a two or more longitudinal girder system. The total quantity for this element is the sum of each girder length.

91	Steel Riveted Girder	Units - LF
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This element defines a girder unit of structural steel that directly supports the bridge deck. This element has a web and flanges that are connected with rivets. This element is part of a two or more longitudinal girder system. The total quantity for this element is the sum of each girder length.

92	Steel Welded Girder	Units – LF
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This element defines a girder unit of structural steel that directly supports the bridge deck. This element has a web and flanges that are connected with welds. This element is part of a two or more longitudinal girder system. The total quantity for this element is the sum of each girder length.

Condition States for WSDOT Elements 90, 91, and 92

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Girder length affected by repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated.
3. Girder length affected by structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Girder span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

96	Concrete Encased Steel Girder	Units – LF
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This element defines a steel girder that is encased in concrete. The total quantity for this element is the sum of each girder length.

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking.
2. Girder length affected by repairs or patches.
3. Girder length affected by structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth), concrete delaminations or spalls in a tension zone.
4. Girder span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

97	Prestressed Concrete Tub Girder	Units - LF
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This element defines a prestressed concrete box girder or Tub Girder as defined in the *Bridge Design Manual* M 23-50. Post-tensioning and span field splices may or may not be present. The total quantity for this element is the sum of each girder length.

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Girder length affected by repair or patch. Capacity repairs such as a strand splicing should record girder span length.
3. Girder length affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.
4. Girder span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.



98	Thin Flange Girder	Units - LF
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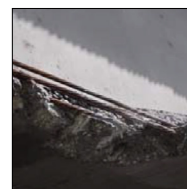
This element defines a precast prestressed concrete girder unit where the top flange is not designed to carry live load and must have a concrete deck. There may be asphalt or a concrete overlay on the concrete slab. This element represents the WSDOT - WFxxTDG girder sections: WF36TDG, WF42TDG, WF50TDG, WF58TDG, WF66TDG, WF74TDG, WF83TDG, WF95TDG, and WF100TDG. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this element is the sum of each girder length.

100	Post Tensioned Concrete Segmental Box Girder	Units – LF
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This element defines a post-tensioned concrete box girder constructed using the segmental precast process. The total quantity for this element is the length of segmental box girders.

Condition States for WSDOT Elements 97, 98, and 100

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Girder length affected by repair or patch. Capacity repairs such as a strand splicing should record girder span length.
3. Girder length affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.
4. Girder span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.



102	Steel Box Girder	Units – LF
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This element defines a box girder unit constructed with structural steel. This element directly supports the bridge deck. The total quantity for this element is the sum of each girder length.

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Girder length affected by repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated.
3. Girder length affected by structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Girder span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

103	Prestressed Concrete Super Girder	Units – LF
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This element defines a prestressed WSDOT girder WF83G, WF95G, WF100G, WF83PTG, WF95PTG, WF100PTG. Girders may or may not be post-tensioned. The total quantity for this element is the sum of each girder length.

104	Post Tension Concrete Box Girder	Units – LF
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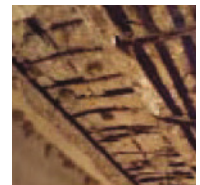
This element defines a box girder unit constructed of post-tensioned, cast in place concrete. The total quantity for this element is the sum of each girder length.

105	Concrete Box Girder	Units – LF
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This element defines a box girder superstructure unit constructed with cast in place reinforced concrete. The total quantity for this element is the sum of each girder length.

Condition States for WSDOT Elements 103, 104, and 105

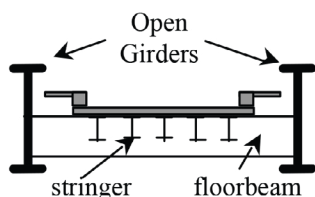
1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Girder length affected by repair or patch. Capacity repairs such as a strand splicing should record girder span length.
3. Girder length affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.
4. Girder span length affected by damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.



107	Steel Open Girder	Units – LF
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This element defines an open girder unit that is constructed of structural steel. An open or “through” girder is part of a two girder system with stringer and floor beam elements that support a bridge deck. Open girders are located on the outside of the bridge. The bridge deck and any sidewalks are contained between the open girders. Bridges with open girders were generally built prior to 1950 and usually have built up riveted steel members. The total quantity for this element is the sum of each girder length.

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Steel open girder length affected by repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated.
3. Steel open girder length affected by structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Steel open girder span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.



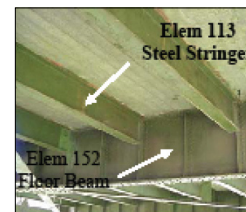
108	Prestressed Concrete Bulb-T Girder	Units – LF
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This element defines a precast prestressed concrete Bulb-Tee girder unit which has little or no span between the top flange. There may be asphalt, a concrete slab, a concrete overlay, or nothing on the top flange. This element represents the following WSDOT girder sections: W35DG, W41DG, W53DG, W65DG, WF39DG, WF45DG, WF53DG, WF61DG, WF69DG, WF77DG, WF86DG, WF98DG, WF103DG. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this element is the sum of each girder length.

109	Prestressed Concrete Multiple Web Girder Units	Units – LF
<p>This element defines a precast prestressed concrete girder that has more than one web. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this element is the sum of each girder length.</p>		
110	Concrete Girder	Units – LF
<p>This element defines a girder (including T-Beams) constructed of non-prestressed reinforced concrete. The total quantity for this element is the sum of each girder length.</p>		
<p>Condition States for WSDOT Elements 108, 109, and 110</p>		
<ol style="list-style-type: none"> 1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations. 2. Girder length affected by repair or patch. Capacity repairs such as a strand splicing should record girder span length. 3. Girder length affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands. 4. Girder span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. 		
		
		
111	Timber Glue-Lam Girder	Units – LF
<p>This element defines a girder unit constructed of glue-lam timber. This element directly supports the bridge deck. The total quantity for this element is the sum of each girder length.</p>		
<ol style="list-style-type: none"> 1. Defects are superficial and have no effect on the structural capacity of the element. Decay, insect infestation, cracks, splits, or checks may exist. 2. Glue-Lam girder length affected by repairs, patches, or plated. 3. Glue-Lam girder length affected by structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. These areas are typically marked with a YELLOW TAG by inspectors. 4. Glue-Lam girder span length with damage in locations or quantity and has reduced the structural capacity of the girder or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. These areas are typically marked with a RED TAG by inspectors. 		

113	Steel Stringer	Units - LF
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This element defines a stringer constructed of structural steel that supports the deck in a stringer-floor beam system. A stringer is connected to a floor beam and directly supports a bridge deck. A steel stringer and floor beam combination is commonly used in steel truss and steel open girder bridges. The total quantity for this element is the sum of each girder length.



1. Defects are superficial and have no effect on the structural capacity of the element.
2. Stringer length affected by repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated.
3. Stringer length affected by structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Stringer span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

114	Concrete Multiple Web Girder Unit	Units - LF
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This element defines a girder constructed of non-prestressed reinforced precast concrete. Structural deficiencies of the edge and bottom surface are addressed in the condition states. The total quantity for this element is the sum of each girder length. Check the NBIS main span type.

115	Prestressed Concrete Girder	Units - LF
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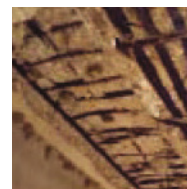
This element defines a girder constructed of precast prestressed concrete that may or may not be post-tensioned and supports the bridge deck. The total quantity for this element is the sum of each girder length.

116	Concrete Stringer	Units – LF
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This element defines a stringer constructed of reinforced concrete that supports the bridge deck in a stringer-floor beam system. The total quantity for this element is the sum of each stringer length. See Steel Stringers and Floor Beams for a more general description.

Condition States for WSDOT Elements 114, 115, and 116

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Girder length affected by repair or patch.
3. Girder length affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.
4. Girder span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.



117	Timber Sawn Girder	Units – LF
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This element defines a girder constructed of sawn timber that supports the bridge deck. The total quantity for this element is the sum of each girder length.

118	Timber Stringer	Units – LF
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This element defines a stringer constructed of timber that supports the bridge deck. The element total quantity is the sum of each stringer length. See Steel Stringers, WSDOT Element 113, for a more general description.

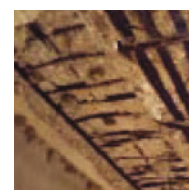
Condition States for WSDOT Elements 117 and 118

1. Defects are superficial and have no effect on the structural capacity of the element. Decay, insect infestation, cracks, splits, or checks may exist.
2. Girder or stringer length affected by repairs or plates.
3. Girder or stringer length affected by structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Typically, locations in a load path with a shell thickness greater than or equal to 1½" are marked with a YELLOW TAG.
4. Girder or stringer span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Typically, locations in a load path with less than a 1½" shell thickness are marked with a RED TAG.

119	Concrete Truss	Units - LF
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This element defines all members in a truss that is constructed of concrete. There is only one concrete truss on the state highway system. The total quantity for this element is the sum of each concrete truss length, which is two times the truss span length.

1. Truss panel length with superficial defects that have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Truss panel length with repairs or patches.
3. Truss panel length affected with structural defects. The defects do not significantly affect structural capacity. Defects do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.
4. Length of truss span affected with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.



126	Steel Thru Truss	Units - LF
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This element includes all structural steel truss members. Code this element for through and pony trusses only. The total quantity for this element is the sum of each truss length, which is two times the truss span length.

131	Steel Deck Truss	Units - LF
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This element includes all truss members of a structural steel deck truss. The top and bottom chords are included in this element. The total quantity for this element is the sum of each truss length, which is two times the truss span length.

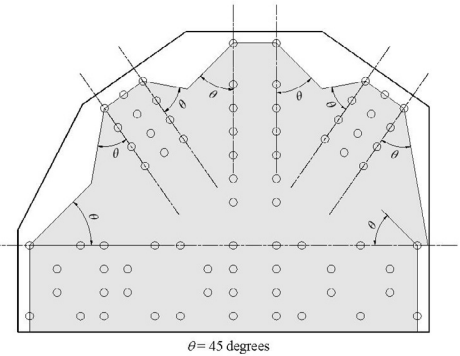
Condition States for WSDOT Elements 126 and 131

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Truss panel length with repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated.
3. Truss panel length with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Truss span length affected by damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

133 Truss Gusset Plates**Units – EA**

This element documents structural defects on gusset plates at the panel points of a truss element. Gusset plates are defined as any plate attached to primary members that transfer primary or secondary load at the panel joint. Significant defects should be considered when they are within the stress zones of the gusset. Stress zones are approximately illustrated as the shaded portion in Figure at right. The total quantity for a truss is the total number of all node points of all trusses

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Number of panel points with repairs or have been reinforced.
3. Number of panel points with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Number of panel points with structural deficiencies in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

**135 Timber Truss****Units – LF**

This element defines a truss constructed of timber members. The total quantity for this element is the sum of each truss length, which is two times the truss span length.

1. Truss panel length with defects that are superficial and have no effect on the structural capacity of the element. Decay, insect infestation, cracks, splits, or checks may exist.
2. Truss panel length with repairs or plates.
3. Truss panel length with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Typically, locations in a load path with a shell thickness greater than or equal to 1½" are marked with a YELLOW TAG.
4. Truss span length affected by damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Typically, locations in a load path with less than a 1½" shell thickness are marked with a RED TAG.

139	Timber Arch	Units - LF
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This element includes all members of an arch constructed of Timber. The total quantity for this element is the length measured from one arch support to the other.

1. Arch panel length with defects that are superficial and have no effect on the structural capacity of the element. Decay, insect infestation, cracks, splits, or checks may exist.
2. Arch panel length with repairs or plates.
3. Arch panel length with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Typically, locations in a load path with a shell thickness greater than or equal to 1½" are marked with a YELLOW TAG.
4. Arch span length affected by damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Typically, locations in a load path with less than a 1½" shell thickness are marked with a RED TAG.

141	Steel Arch	Units - LF
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This element includes only the arch constructed of structural steel. When coding NBI, pier caps, cross beams, and any other coded substructure elements within the arch span are considered superstructure elements. The total quantity for this element is the length measured from one arch support to the other.

142	Steel Tied Arch	Units - LF
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This element includes all members of a tied arch constructed of structural steel. The bottom and top chords are included in this element. The total quantity for this element is the length measured from one arch support to the other.

Condition States for WSDOT Elements 141 and 142

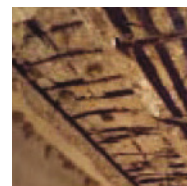
1. Arch panel length with defects that are superficial and have no effect on the structural capacity of the element.
2. Arch panel length with repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated.
3. Arch panel length with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Arch span length affected by damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

143	Steel Suspender	Units – EA
<p>This element defines a steel suspender member used hang a bridge deck from an arch or truss. The total quantity for this element is the total number of suspenders.</p> <ol style="list-style-type: none"> 1. Number of suspenders with defects that are superficial and have no effect on the structural capacity of the element. 2. Number of suspenders with repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated. 3. Number of suspenders with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth). 4. Number of suspenders with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired. 		
144	Concrete Arch	Units – LF
<p>This element only defines the arch (open/closed spandrel, bowstring, etc.) and is constructed of non-prestressed reinforced concrete. When coding NBI, pier caps, cross beams, and any other coded substructure elements within the arch span are considered superstructure elements. The total quantity for this element is the length measured from one arch foundation to the other.</p> <ol style="list-style-type: none"> 1. Arch panel length with defects that are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations. 2. Arch panel length with repairs or patches. 3. Arch panel length with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands. 4. Arch span length affected by damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. 		

145	Earth Filled Concrete Arch	Units – LF
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This element defines an earth filled arch constructed of reinforced concrete. The total quantity for this element is the length measured from one arch foundation to the other. If there is a concrete deck constructed on the fill, WSDOT element 14 applies. If there is an ACP wearing surface, WSDOT element 800 or 801 applies.

1. Arch span length with defects that are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Arch span length with repairs or patches.
3. Arch span length with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.
4. Arch span length affected by damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.



146	Suspension – Main Cable	Units – EA
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This element defines a main steel cable used to support the superstructure in a suspension bridge. The total quantity for this element is the number of cables.

147	Suspension – Suspender Cable	Units – EA
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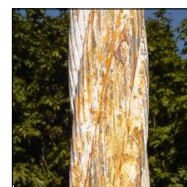
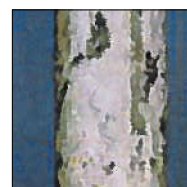
This element defines a suspender steel cable that connects the bridge superstructure to the main suspension cable. Suspender cables include the anchor device at the ends and the zinc protection on the wires. The outer protection system is usually a form of a paint element. The total quantity for this element is the number of steel cables.

149	Cable Stayed Bridge – Cable	Units – EA
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This element defines a steel cable used to support the superstructure in a cable stayed bridge. The cable stays include the anchor device at the ends. The total quantity for this element is the number of steel cables.

Condition States for WSDOT Elements 146, 147, and 149

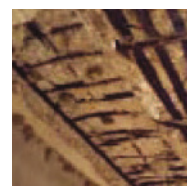
1. Number of cables with no defects. Zinc coating may be dull gray showing early signs/stages of zinc oxidation. New replacement cables are coded in this condition state.
2. Number of cables with defects that are insignificant and do not affect the capacity of the cable. Zinc coating has white spots or areas of the surface which indicate corrosion of the zinc protection.
3. Number of cables or anchors with defects that are beginning to affect the capacity of the cable, but are within acceptable design limits. Localized areas of zinc depletion and showing rust spots, but there is no visible section loss.
4. Number of cables or anchors with defects that have clearly affected the capacity. This includes broken wires or localized section loss due to other defects. The zinc protective coating is largely depleted with ferrous rust prevalent in many locations along the cable length.



150	Concrete Column on Spandrel Arch	Units – EA
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This element defines the column supports on a spandrel arch bridge. The total quantity for this element is the number of columns supported by the arch.

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Number of columns with repairs or patches.
3. Number of columns with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.
4. Number of columns with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.



152	Steel Floor Beam	Units – LF
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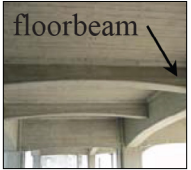


This element defines a floor beam constructed of structural steel that supports stringers in a stringer-floor beam system. Floor beams are load carrying elements located transversely to the general bridge alignment. Floor beams transmit the loads from the deck and/or stringers to the outside open girders or to the bottom chord of a truss bridge. The total quantity for this element is the sum of each floorbeam length.



1. Defects are superficial and have no effect on the structural capacity of the element.
2. Floorbeam length affected by repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated.
3. Floorbeam length affected by structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Floorbeam span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

154	Prestressed Concrete Floor Beam	Units – LF
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This element defines a floor beam constructed of prestressed concrete that supports the bridge deck in a stringer-floor beam system. The total quantity for this element is the sum of each floorbeam length.

155	Concrete Floor Beam	Units – LF
<p>This element defines a floor beam constructed of reinforced concrete that supports the bridge deck in a stringer-floor beam system. Floor beams are load carry elements located transversely to the general bridge alignment. Floor beams transmit the loads from the deck and/or stringers to the outside open girders. The total quantity for this element is the sum of each floorbeam length.</p>		
<p>Condition States for WSDOT Elements 154 and 155</p>		
<ol style="list-style-type: none"> 1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations. 2. Floorbeam length affected by repairs or patches. 3. Floorbeam length affected by structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands. 4. Floorbeam span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. 		 
156	Timber Floor Beam	Units – LF
<p>This element defines a stringer constructed of timber that supports the bridge deck. The total quantity for this element is the sum of each floorbeam length. See Steel Floorbeam, WSDOT Element 152, for a more general description.</p>		
<ol style="list-style-type: none"> 1. Defects are superficial and have no effect on the structural capacity of the element. Decay, insect infestation, cracks, splits, or checks may exist. 2. Floorbeam length affected by repairs or plates. 3. Floorbeam length affected by structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Typically, locations in a load path with a shell thickness greater than or equal to 1½" are marked with a YELLOW TAG. 4. Floorbeam span length with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Typically, locations in a load path with less than a 1 ½ shell thickness are marked with a RED TAG. 		

160	Steel Column on Spandrel Arch	Units – EA
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This element defines the column supports on a spandrel arch bridge. The total quantity for this element is the number of columns supported by the arch.

161	Steel Hanger	Units – EA
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This element defines the hanger portion of a pin and hanger usually on a steel girder. Truss “hanger” members are not included in this element. The total quantity for this element is the number of steel hangers on the bridge. Generally there will be two hangers at each location.

Condition States for WSDOT Elements 160 and 161

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Number of steel columns or hangers with repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated.
3. Number of steel columns or hangers with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Number of steel columns or hangers with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

162	Steel Pin	Units – EA
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This element defines a structural pin used in any connection joint in a girder or truss. The total quantity for this element is the number of pins on the bridge. Zero force and construction pins are not included in the quantity. Pins in bearing elements are not included unless they have uplift loadings.

1. Number of pins and associated connection plates are in good condition. Visual Inspection: There may be minor rust or shallow surface deformations on the exposed pin surfaces. Minor amounts of rust powder or paint damage may be present suggesting minor pin rotation in place. No pack rust is present between associated connection plates. There is no noise associated with the pin connection. Ultrasonic Testing (UT): Transducer can be applied to both ends of pin allowing a complete scan of pin grip surfaces, there are strong shoulder and end reflections, and there are no UT indications. UT indications are defined as pips in the grip area that are three times larger (3:1) than the background noise when the GAIN is adjusted to produce a 90 to 100 percent reflection height for the far shoulder.
2. Number of pins and associated connection plates have defects that do not affect the strength or serviceability of the bridge. Visual Inspection: Corrosion with pitting or laminar rust may be present. Minor abnormalities may be observed in alignment, pin wear, or deck joint movement. Pack rust may be present between connection plates, but is not judged to put a jacking force between the pin nuts. The connection may have some rust powder and/or make noise under loading. Ultrasonic Testing (UT): For pins UT inspected from both ends, there may be non-coincident indications between 10 and 20 percent of the far shoulder reflection height. There may be loss in shoulder or back reflections which can be explained by pin end conditions (dents, holes, corrosion). Pins that can be UT inspected from one end only are considered CS2, even if they have no indications or have indications less than 10 percent of the far shoulder reflection height.
3. Number of pins and associated connection plates have defects that may affect the strength or serviceability of the bridge. Visual Inspection: Significant corrosion may be present, suggesting that pin is “frozen” in place. Measurable abnormalities may be observed in alignment, pin wear, or deck joint movement. Pack rust may be present between connection plates that place a jacking force between the pin nuts. The connection may have significant amounts of rust powder and/or make noise under loading. Ultrasonic Testing (UT): For pins UT inspected from both ends, there may be coincident indications (of any size) or non-coincident indications greater than 20 percent of the far shoulder reflection height. There may be loss in shoulder or back reflections that cannot be explained by pin end conditions (dents, holes, corrosion). Pins that can be UT inspected from one end only are considered CS3 if there are indications greater than 10 percent of the far shoulder reflection height.
4. Number of pins and associated connection plates have defects that are judged to affect the strength or serviceability of the bridge. Visual Inspection: There may be “frozen” pins designed for free rotation as part of normal bridge movement. Pack rust may be present between connection plates that are causing distortion/displacement of plates or pins.

163 Tension Hold Down Anchor Assembly**Units – EA**

This is a fracture critical component of the bridge that carries uplift loads from the superstructure to the substructure. The anchorage may consist of several parts with built-up steel members. Each location has anchor bolts in tension that must be evaluated and included in a Fracture Critical Report. The element is defined as all parts in tension between the lower tip of the anchor bolts to the first pin or truss member. A pin is usually present and included in element 162 because it carries uplift loads. The total quantity for this element is the number of Tension Hold Down Anchor Assemblies on the bridge.



WSDOT bridges known to have Tension Hold Down Anchor Assemblies are: 97/420, 25/130, 2/35, 99/560, 305/10, 82/280S.

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Number of Tension Hold Down Anchor Assemblies with repairs.
3. Number of Tension Hold Down Anchor Assemblies with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Number of Tension Hold Down Anchor Assemblies with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

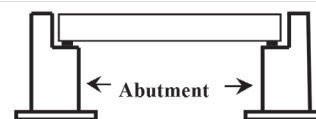
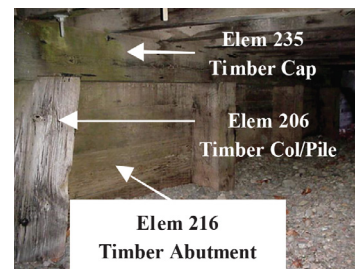
4-4 Substructure

The evaluation of the substructure elements are based on those portions of the member that are exposed for visual inspection and included in the element quantity. If an element is added to a bridge or quantities are changed due to exposure or discovery by other means, do not delete the historical information in subsequent inspections. Simply note the prior exposure or those members not visible and document the current condition.

4-4.1 Abutments

An abutment is a substructure unit located at the end of a bridge that is designed to retain the fill supporting the roadway, and support the bridge superstructure. Bridges that terminate in mid-span or at a pier that is not at grade do not have an abutment substructure unit and do not have abutment elements. These cases will use other appropriate structural elements to evaluate condition.

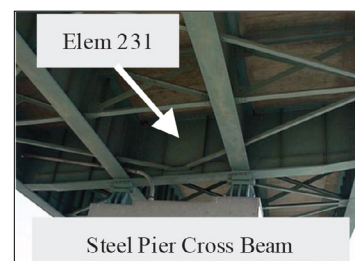
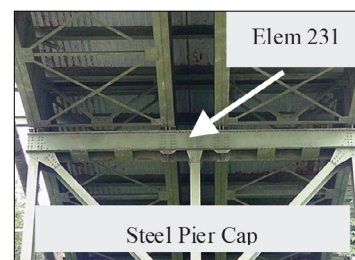
All abutments shall be evaluated for the capacity to transfer design loads to a foundation thru structural elements. The roadway embankment with non-monolithic concrete wingwalls, timber planking, or other abutment retaining systems are included in the evaluation of the WSDOT Abutment Fill element 200 (EA) where the evaluation is limited to no more than 25 feet from the abutment. Timber Abutment element 216 (LF) and Cantilever Abutment element 219 (EA) are elements equivalent to element 200.



4-4.2 Pier Cap/Cross Beam

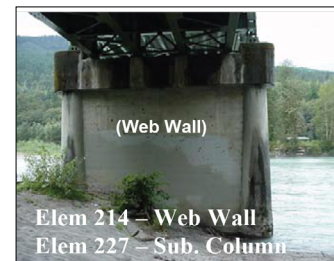
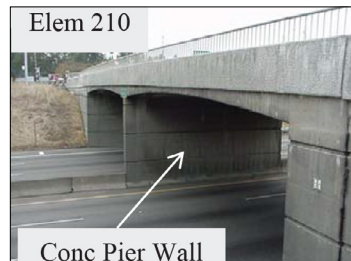
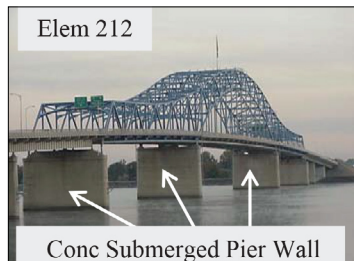
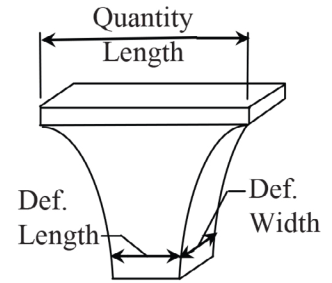
A pier cap is an element that is attached to the top of a pier and is used to support the superstructure of a bridge. A pier cross beam is generally attached to the girders and is used to distribute the loads from the girders to the pier.

One WSDOT element is used to define either a cap or cross beam constructed of the same material.



4-4.3 Pier Wall Definition

A pier wall is a substructure pier element. For WSDOT elements, a pier wall is defined using two criteria: if the length (transverse direction) is 3 times greater than the width (longitudinal direction) at the bottom; and the wall extends full height from the foundation to the superstructure. If the pier does not meet these two criteria, then the element would be coded as a column or other pier.



4-4.4 Pile/Column Elements

These long slender members transfer load normally as a part of the bridge substructure. The bottom of a column element may be visible or supported on unknown foundations. For element and inspection purposes, a pile is inspected as a designed column for the visible portion above ground or if visible in the past. Single columns supported on a single shaft are to be considered the same as one column or column length even though a part of the shaft is visible.

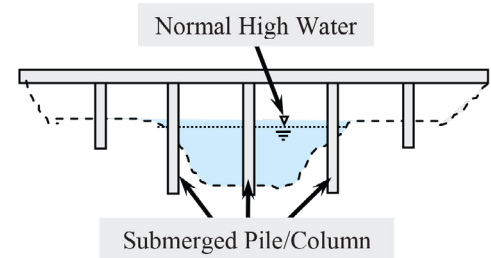
4-4.5 Foundation Elements

WSDOT Timber Foundation and Concrete Foundation elements document that a foundation is visible, and the structural condition may or may not be related to scour. The foundation may be a spread footing, or a footing supported by piles or drilled shafts. The foundation element is based on the footing material and the piles may be of any material. The condition of the foundation is the focus of these elements, not the pile design or material.

If the supporting piles are visible, then the pile element should be added to the bridge. Do not delete the pile element in subsequent inspections. The total quantity is the quantity of piles supporting the exposed foundation, not just the number of exposed piles. When scour threatens or reduces the condition, the scour documentation and condition is recorded separately in WSDOT element 361 and not recorded in the foundation element.

4-4.6 Submerged Element Definition (Column, Pier Wall, Foundation)

A Submerged element in BMS is defined as a substructure element located within the normal high water banks of a waterway channel. Repair or replacement of these elements may have special construction requirements as outlined in the environmental permits.



200	Abutment Fill	Units – EA
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This element is defined as the soil retained behind a concrete or steel abutment and includes the materials retaining the embankment such as non-monolithic concrete wing walls or other retaining wall system. The evaluation of the fill or retaining systems should not extend beyond 25 feet or the approach slab, whichever is greater.

Normally structures have two abutments at grade. When bridges terminate at intermediate piers or in mid-span (not on the ground), then this element does not apply. In addition, WSDOT Element 200 is equivalent to and does not apply to structures with WSDOT Timber Abutment 216 (LF) or Cantilever Abutment Element 219 (EA).

Erosion outside of the abutment/wingwalls can be documented in the notes, but is not included in the evaluation or condition of the element.

1. Defects are superficial and have no effect on the structural capacity or performance of the fill.
2. Number of abutments that have been repaired.
3. Number of abutments with a fill problem which does not significantly affect the support of the traveled lanes. Deficiencies do not warrant analysis, but may require repairs.
4. Number of abutments with a fill problem in locations or quantity and has reduced the structural capacity of the soil to support the approach or roadway. It is a threat to traffic. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

202	Steel Pile/Column	Units – EA
This element defines a column or column portion of a pile constructed of structural steel visible for inspection.		
<ol style="list-style-type: none"> 1. Defects are superficial and have no effect on the structural capacity of the element. 2. Number of pile/columns with repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated. 3. Number of pile/columns with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth). 4. Number of pile/columns with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired. 		
203	Prestressed Hollow Concrete Pile/Column	Units – EA
This element defines a column or column portion of a pile constructed of prestressed concrete and hollow. Inspection includes the visible portion above ground line.		
204	Prestressed Concrete Pile/Column	Units – EA
This element defines a column or column portion of a pile constructed of prestressed concrete visible for inspection.		
205	Concrete Pile/Column	Units – EA
This element defines a column or column portion of a pile constructed of reinforced concrete visible for inspection. Usually, WSDOT concrete piles are designed and constructed inside a sacrificial steel pipe.		
Condition States for WSDOT Elements 203, 204 and 205		
<ol style="list-style-type: none"> 1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations. 2. Number of pile/columns that has been repaired or patched. 3. Number of pile/columns has structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands. 4. Number of pile/columns with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. 		

206	Timber Pile/Column	Units – EA
<p>This element defines a column or column portion of a pile constructed of timber visible for inspection.</p>		
<ol style="list-style-type: none"> 1. Defects are superficial and have no effect on the structural capacity of the element. Decay, insect infestation, cracks, splits, or checks may exist. 2. Number of pile/columns with repairs, plates, or splices. 3. Number of pile/columns with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Typically, locations in a load path with a shell thickness greater than or equal to 1½" are marked with a YELLOW TAG. 4. Number of pile/columns with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Typically, locations in a load path with less than a 1½" shell thickness are marked with a RED TAG. 		
207	Concrete Pile/Column w/Steel Jacket	Units – EA
<p>This element defines a column or column portion of a concrete pile where the exposed surface has been retrofitted top to bottom with a steel jacket visible for inspection. This changes the deterioration and management of the pile. Element 207 replaces existing pile elements 204, 205, 226, or 227 where the exiting pile quantities decrease and Element 207 quantities increase by the number of steel jacketed piles. Construction of the steel jacket also rehabilitates any pre-existing defects and the quantities are initially coded in condition state one.</p>		
<p>Pile/columns that are not jacketed top to bottom are considered a repair and Element 207 does not apply; such as a timber pile steel splice. Code these repairs as CS2 in the existing pile element.</p>		
<ol style="list-style-type: none"> 1. Defects are superficial and have no effect on the structural capacity of the element. 2. Number of pile/columns with repairs. 3. Number of pile/columns with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth). 4. Number of pile/columns with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. 		

208	Concrete Pile/Column w/Composite Wrap	Units – EA
<p>This element defines a concrete column or column portion of a pile where the exposed surface has been retrofitted top to bottom with a composite wrap. Examples of composite material are carbon fiber and fiberglass. This changes the deterioration and management of the pile. Element 208 replaces existing pile elements 204, 205, 226, or 227 where the existing pile quantities decrease and Element 208 quantities increase by the number of composite piles. Composite wrapping also rehabilitates any pre-existing defects and the quantities are initially condition state one.</p> <p>Pile/columns that are not wrapped top to bottom are considered a repair and Element 208 does not apply, such as a fiberglass repair to a timber pile at the ground line. Code these repairs as CS2 in the existing pile element.</p> <p>The structural condition should be based on the quantity and location of visible defects. Defects should be documented well enough to determine a change in condition. Defects include cracked or damaged composite reinforcement, abrasions, or seepage of moisture. Sounding with a rock hammer should use caution and not damage the resin materials.</p> <ol style="list-style-type: none"> 1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, superficial cracked resin, debonding, or blisters on the surface. 2. Number of composite wrapped Pile/Columns with repairs. 3. Number of composite wrapped Pile/Columns with structural defects. The defects do not significantly affect structural capacity of the wrap or pile/column. Deficiencies do not warrant analysis, but may require repairs. 4. Number of composite wrapped Pile /Columns with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. 		
209	Submerged Concrete Pile/Column w/Steel Jacket	Units – EA
<p>This element defines a submerged column or column portion of a pile that is constructed of reinforced concrete and has been seismically retrofitted with a steel jacket visible for inspection.</p> <ol style="list-style-type: none"> 1. Defects are superficial and have no effect on the structural capacity of the element. 2. Number of steel jacketed Pile/Columns with repairs. 3. Number of steel jacketed Pile/Columns with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth). 4. Number of steel jacketed Pile/Columns with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. 		

210	Concrete Pier Wall	Units – LF
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This element defines a pier wall constructed of reinforced concrete. The total quantity for this element is the length at the top of the wall.

211	Other Pier Wall	Units – LF
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This element defines a pier wall that is constructed of a non-standard material (rock and mortar) or non-standard construction. The total quantity for this element is the length at the top of the wall.

212	Concrete Submerged Pier Wall	Units – LF
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This element defines a submerged pier wall constructed of reinforced concrete. The total quantity for this element is the length at the top of the wall.

213	Other Submerged Pier Wall	Units – LF
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This element defines a submerged pier wall that is constructed of a non-standard material (rock and mortar) or non-standard construction. The total quantity for this element is the length at the top of the wall.

Condition States for WSDOT Elements 210, 211, 212, and 213

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Length of pier wall with repairs.
3. Length of pier wall with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Entire length of pier wall with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

214	Concrete Web Wall between Columns	Units – LF
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This element defines a secondary concrete wall constructed between pier columns. This element includes railroad crash barriers. The total quantity for this element is the length at the top of the wall.

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Affected length of Web wall with repairs.
3. Length of Web wall with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Entire length of Web wall with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

215	Concrete Abutment	Units – LF
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This element is defined as a concrete abutment or a concrete cap at the abutment which are designed to carry design loads to a foundation. A concrete abutment is a short or tall wall supporting the superstructure. An abutment cap is generally a rectangular beam supporting the superstructure. An abutment cap is included in this element and excluded from the quantity of element 234, Concrete Caps, elsewhere in the bridge. An abutment cap may be supported with concrete, steel, or timber columns or piles and the columns are coded separately and not included in this element, but are included with the quantity and evaluation of the other the similar columns in the bridge. The columns are only coded if they are visible or have been visible in the past.

The element quantity is measured along the skew and includes concrete monolithic wingwalls up to the first open joint or expansion joint. Wingwalls monolithic with the abutment shall be included evaluation of the abutment. The length of monolithic wingwall shall not exceed 20 feet per corner,

The embankment and retaining system, or retaining system beyond a monolithic wingwall, are documented in WSDOT element 200.

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Affected length of abutment with repairs.
3. Length of abutment with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Entire length of abutment when damage exists in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

216	Timber Abutment	Units – LF
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This element defines the roadway embankment fill behind a timber cap includes the sheet materials retaining the embankment. The total quantity is the length of the timber cap. Timber caps at the abutment and the piles supporting the caps are not included in this element. The caps are included in the element 235 with other timber caps and the piles are included with the other pile elements in the bridge.

Erosion outside of the abutment/wingwalls can be documented in the notes, but is not included in the evaluation of the element condition states.

1. Defects are superficial and have no effect on the structural capacity or performance of the fill.
2. Length of abutment that has been repaired.
3. Length of abutment with a fill problem which does not significantly affect the support of the traveled lanes. Deficiencies do not warrant analysis, but may require repairs.
4. Length of abutment with a fill problem in locations or quantity and has reduced the structural capacity of the soil to support the approach or roadway. It is a threat to traffic. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

217	Other Abutment	Units - LF
<p>This element defines an abutment not constructed of steel, timber, or concrete such as rock/mortar. The element quantity is the length of abutment measured along the skew. The element quantity includes monolithic wing walls but not to exceed 20 feet per corner.</p> <p>Document the condition of the embankment and the embankment retaining system conditions in WSDOT element 200.</p> <ol style="list-style-type: none"> 1. Defects are superficial and have no effect on the structural capacity of the element. 2. Affected length of abutment with repairs 3. Affected length of abutment with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. 4. Entire length of abutment when damage exists in locations or quantity and has reduced the structural capacity of the abutment. Structural analysis is warranted or has determined repairs are essential to restore the full abutment capacity. 		
218	Steel Abutment	Units - LF
<p>This element defines an abutment constructed of structural steel which is usually a steel cap at the abutment. Similar to concrete abutment caps, steel abutment caps are included in this element and are not included in the quantity of element 233, steel cap/crossbeam. The columns supporting the steel cap are coded separately or included with other similar columns in the bridge. The element quantity is the length of steel abutment cap measured along the skew.</p> <p>Document the embankment conditions and the embankment retaining system conditions in WSDOT element 200.</p> <ol style="list-style-type: none"> 1. Defects are superficial and have no effect on the structural capacity of the element. 2. Length of abutment with repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated. 3. Length of abutment with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth). 4. Entire length of abutment affected when damage exists in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. 		

219 Concrete Cantilevered Span Abutment**Units – EA**

The WSDOT Cantilever Span Abutment element was created to keep this abutment type separate from the typical abutment elements. This element defines an abutment for the end of a bridge span that is cantilevered from the first or last pier at grade. The default notation assumes the pavement seat (abutment 1) is Pier 1; the cantilever span is Span 1; the first pier is Pier 2. These abutments do not carry load but do retain fill where the defects of structural members are evaluated as part of the superstructure elements.



The definition, condition evaluation, and units are the same as for the WSDOT element 200 where this element is defined as the soil retained behind the abutment and wing walls or retaining walls that support an asphalt roadway or approach slab. The fill evaluation should not extend beyond 25 feet or the approach slab, whichever is greater. Erosion outside of the abutment/wingwalls can be documented in the notes, but is not included in the evaluation of the element condition states.

1. Defects are superficial and have no effect on the structural capacity or performance of the fill.
2. Number of abutments that have been repaired.
3. Number of abutments with a fill problem does not significantly affect the support of the traveled lanes. Deficiencies do not warrant analysis, but may require repairs.
4. Number of abutments with a fill problem in locations or quantity and has reduced the structural capacity of the soil to support the approach or roadway. It is a threat to traffic. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

220 Concrete Submerged Foundation**Units – EA**

This element defines a reinforced concrete foundation footing supported by shafts, piles, or soil (spread footing) that is visible for inspection and may be always, or seasonably covered by water. Do not delete the element from the bridge because the foundation is no longer visible. Scour deficiencies at a concrete abutment are included in WSDOT element 361 and are not included in this element.

The piles may be timber, concrete or steel. If the supporting piles become visible, then the pile element should be added to the bridge. The total quantity is the quantity of piles supporting the exposed foundation, not just the number of exposed piles. Do not delete the element in subsequent inspections. The total quantity of foundations/piles will increase each time a new location is exposed and visible.

221	Concrete Foundation	Units – EA
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This element defines a reinforced concrete foundation footing supported by shafts, piles, or soil (spread footing) that is visible for inspection. Scour deficiencies at a concrete foundation are included in WSDOT element 361 and are not included in this element. Plinths are a form of spread footing and included in this element which are a small concrete base that supports a column.

The piles may be timber, concrete or steel. If the supporting piles become visible, then the pile element should be added to the bridge. The total quantity is the quantity of piles supporting the exposed foundation, not just the number of exposed piles. Do not delete the element in subsequent inspections. The total quantity of foundations/piles will increase each time a new location is exposed and visible.

Condition States for WSDOT Elements 220 and 221

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Number of foundations with repairs.
3. Number of foundations with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Number of foundations with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

222	Timber Foundation	Units – LF
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This element defines a timber foundation element that includes a mud sill which is a spread footing and the rare case of a pile supported footing. A timber pile supported footing is a where timber horizontal footing member is a support for columns and the timber member is supported by piles. The total quantity for this element is the length of timber foundation.

1. Defects are superficial and have no effect on the structural capacity of the element. Decay, insect infestation, cracks, splits, or checks may exist.
2. Total length of foundation if repairs exist.
3. Total length of foundation if structural defects exist, but the defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Typically, locations in a load path with a shell thickness greater than or equal to 1½" are marked with a YELLOW TAG.
4. Total length of foundation where damage exists in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Typically, locations in a load path with less than a 1½ shell thickness are marked with a RED TAG.

225	Steel Submerged Pile/Column	Units – EA
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This element defines a column or column portion of a pile constructed of steel and is visible for inspection and may be always or seasonably covered by water. Do not delete the element from the bridge because the element is no longer visible. The exposure may be intentional or caused by scour.

226	Prestressed Concrete Submerged Pile/Column	Units – EA
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This element defines a submerged column or column portion of a pile constructed of prestressed concrete and is visible for inspection and may be always or seasonably covered by water. Do not delete the element from the bridge because the element is no longer visible. The exposure may be intentional or caused by scour.

227	Concrete Submerged Pile/Column	Units – EA
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This element defines a submerged column or column portion of a pile constructed of reinforced concrete and is visible for inspection and may be always or seasonably covered by water. Do not delete the element from the bridge because the element is no longer visible. The exposure may be intentional or caused by scour.

Condition States for WSDOT Elements 225, 226, and 227

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Number of pile/columns with repairs.
3. Number of pile/columns with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Number of pile/columns with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

228	Timber Submerged Pile/Column	Units – EA
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This element defines a submerged column or column portion of a pile constructed of reinforced timber and is visible for inspection and may be always or seasonably covered by water. Do not delete the element from the bridge because the element is no longer visible. The exposure may be intentional or caused by scour.

1. Defects are superficial and have no effect on the structural capacity of the element. Decay, insect infestation, cracks, splits, or checks may exist.
2. Number of pile/columns with repairs, plates, or splices.
3. Number of pile/columns with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Typically, locations in a load path with a shell thickness greater than or equal to 1½" are marked with a YELLOW TAG.
4. Number of pile/columns with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Typically, locations in a load path with less than a 1½" shell thickness are marked with a RED TAG.

229	Timber Cap Rehab with Steel	Units – LF
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This element consists of a timber cap rehabilitation where alternate load paths to piling are provided by steel members on the exterior of the cap and the timber cap remains in place. The timber conditions are excluded from the condition evaluation. The total quantity for this element is the length of the existing timber pier cap, where this quantity is deducted from the total quantity of Element 234.

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Steel span length of pier cap rehabilitation with repairs.
3. Steel length of pier cap rehabilitation with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Steel span length of pier cap rehabilitation with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

231	Steel Pier Cap/Crossbeam	Units – LF
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This element defines a steel pier cap or crossbeam. The total quantity for this element is the length at the top of the crossbeam.

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Steel span length of pier cap/crossbeam with repairs.
3. Steel span length of pier cap/crossbeam with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth).
4. Steel span length of pier cap/crossbeam with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

232	Submerged Hollow Prestressed Concrete Pile/Column	Units – EA
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This element defines a column or column portion of a pile constructed of prestressed concrete pile that has an interior void or is hollow. Inspection includes the visible portion above ground line and may be always or seasonably covered by water.

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Number of pile/columns that have been repaired or patched.
3. Number of pile/columns with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.
4. Number of pile/columns with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

233	Prestressed Concrete Pier Cap/Crossbeam	Units – LF
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This element defines a prestressed concrete pier cap or crossbeam. The total quantity for this element is the length at the top of the crossbeam.

234	Concrete Pier Cap/Crossbeam	Units – LF
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This element defines a reinforced concrete pier cap or crossbeam. Integral pier caps with girders framed directly into the crossbeam are also included in this element. The total quantity for this element is the length at the top of the crossbeam.

Condition States for WSDOT Elements 233 and 234

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Length of pier cap/crossbeam affected by repair or patch. Capacity repairs such as a strand splicing should record girder span length.
3. Length of pier cap/crossbeam affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.
4. Concrete span length of pier cap/crossbeam affected by damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

235	Timber Pier Cap	Units – LF
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This element defines a timber pier cap that directly supports the superstructure. The total quantity for this element is the length at the top of the crossbeam.

1. Defects are superficial and have no effect on the structural capacity of the element. Decay, insect infestation, cracks, splits, or checks may exist.
2. Length of pier cap with repairs, plates, or splices.
3. Length of pier cap with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Typically, locations in a load path with a shell thickness greater than or equal to 1½" are marked with a YELLOW TAG.
4. Timber span length of pier cap with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Typically, locations in a load path with less than a 1 ½ shell thickness are marked with a RED TAG.

236	Concrete Floating Pontoon	Units – Cell
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A concrete floating bridge is a series of post-tensioned floating pontoons which are subdivided into internal compartments called cells. Traffic may ride directly on the top of the pontoon or the roadway may be elevated above the pontoon and supported by columns. This element includes all pontoons regardless of size or configuration and all cells shall be evaluated at the same risk to the bridge condition. Deck elements will apply for the entire length of the pontoon structure. Pontoon condition will include the top slab where the deck /soffit elements exist on the pontoon. The deck/soffit elements are not included where the deck is elevated above the pontoon. The total quantity for the Concrete Floating Pontoon element is the total number of pontoon cells for the bridge.

Concrete pontoons are specially designed to be water tight and dry while in service. The concrete is specifically designed to be visually crack free and have low permeability with water tight construction joints. Water tight design is the basis for condition evaluation of the pontoon below water line and is to include, but is not limited to the assessment of post-tensioned concrete, connections between pontoons, WSDOT element 237-Pontoon Hatch/Bulkheads, and the risk to buoyancy. Water tight criteria shall not apply to the evaluations of conventionally designed concrete conditions above the waterline.

Concrete cracking shall be assessed on the location:

- Above or below the waterline;
- Whether it is in an exterior or interior wall;
- Whether it is active or in-active;
- And based on the design criteria that visible cracking should not exist on submerged surfaces.

An active crack is defined for this element as a crack that allows water to pass into or through a concrete section which is a risk for transporting fine materials out of the section or a source of contaminants into the section. Active cracks may be visible under normal bridge loading or only visible under storm conditions.

The presence of water in a cell is evaluated based on the time required to obtain a measured depth of water. Stated another way, the evaluation is based on the rate of accumulation, not the total depth of water. For example, seepage in a cell is defined as, less than 1" of water accumulated over a period of one year. Ballasted cells shall establish a void ratio of the ballast to calculate a volume of water in a cell, **and also the actual infiltration rate of water assuming no ballast was present.**

This Concrete Floating Pontoon element also defines the relationship between the bridge element condition and the corresponding NBI Substructure Condition rating or NBI Item 060.

1. Number of pontoon cells with defects that are superficial and are insignificant to structural capacity or buoyancy of the cell, pontoon or bridge. The cell concrete surfaces may have structurally insignificant hairline cracks, possibly sealed with Crystalline during construction, with no history of seepage. The cell is dry. A cell may have water present due to condensation **or from water accumulating at a rate slower than would be considered a CS3 "trace" amount of water.**
 - If the total quantity is in CS1, then NBI Item 060 shall be an 8.

2. Number of pontoon cells with a repair such as, but not limited to a concrete patch or an epoxy injected sealed crack.
 - If repairs are above water level, or on interior walls between cells, then NBI Item 060 shall be a 7.
 - If repairs are below water level, then NBI Item 060 shall be a 6.
3. Number of pontoon cells with significant defects. Conventional concrete defects which do not affect structural capacity of the bridge. Water tight defects below the waterline which may affect buoyancy of the cell, pontoon or the bridge. Typical CS3 submerged defects include, but are not limited to seepage of less than 1" of water accumulation in a year (trace). **Trace is further defined as the amount of water required to manifest as puddled water over more than 50% of the pontoon floor. Below this amount of water, the pontoon cell is considered dry. Pontoon cells which have water present, but does not increase in amount for 3 consecutive years are considered CS1 cell's.**

Pontoon cells will be monitored annually for water when there is more than 1" accumulation in a year, but do not meet the leaking requirements of CS4.

- If cells are in CS3 due to seepage, then NBI Item 060 shall be a 6.
 - If eight or more adjacent or contiguous cells in a single pontoon are in CS3, then NBI Item 060 shall be a 5.
 - If 20 percent of the cells in one pontoon, or a total of 10 percent of the cells in adjoining pontoons or 5 percent of the total element quantity are in CS3, then NBI Item 060 shall be a 4.
4. Number of pontoon cells with damage in locations or quantity, which has reduced the structural capacity of the pontoon or threatens the buoyancy of a cell, the pontoon or the bridge. Wet conditions that indicate a threat to a cell's buoyancy include, but not limited to: Water leaks 1 inch or more per year in three consecutive years; Water leaks 2 inches or more in a year; Any cell visually leaking water **at a rate greater than what would be classified as seepage for a CS3 cell.** Any cell with a pontoon hatch or bulkhead in CS4, see WSDOT element 237.
 - If cells are in CS4, then NBI Item 060 shall be a 4.
 - If eight or more non-adjacent cells in a single pontoon are in CS4 or one cell leaks $\frac{1}{2}$ inch per month, then NBI Item 060 shall be a 3.
 - If eight or more adjacent cells in a single pontoon are in CS4, or one cell leaks 1 inch of water per month, then NBI Item 060 shall be a 2.
 - If 20 percent of the cells in one pontoon, or a total of 10 percent of the cells in adjoining pontoons or 5 percent of the total element quantity are in CS4, then NBI Item 060 shall be a 2.
 - If one cell leaks 1 inch of water per month, for three consecutive months, then the NBI Item 060 shall be a 1 and the bridge shall be closed to traffic.
 - If there is a measurable or visual change in the alignment or the free board distance at any location on the pontoon, then the NBI Item 060 shall be a 1 and the bridge shall be closed to traffic.

237	Pontoon Hatch/Bulkhead	Units – EA
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This element defines a steel deck or bulkhead hatch access. Deck hatches are accessed from the exterior of a pontoon and bulkhead hatches provide access between cells. The condition evaluation of a hatch includes, but is not limited to the ability of a hatch to provide a watertight structural seal. The performance of the hatches is critical to the design buoyancy of the pontoon structure during extreme events. The total element quantity is the total number of hatch and bulkheads on a bridge.

1. Defects are superficial and are insignificant to performance of the hatch. Insignificant amounts of water enter a cell when a deck hatch is closed.
2. Number of hatch/bulkheads with temporary repairs such as: partially replaced seals, repaired hold-down dogs or locks.
3. Number of hatch/bulkheads with structural defects. The defects do not threaten performance of the hatch. Number of hatches which allow water accumulation into a cell of less than 1" per year.
4. Number of hatch/bulkheads with damage that threatens performance during an extreme event. Number of hatches which allow water accumulation into a cell of 1" or more per year. All pontoon cells in WSDOT element 236 shall be coded CS4 that have a deck hatch or bulkhead hatch coded CS4.

238	Floating Bridge – Anchor Cable	Units – EA
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This element defines a steel anchor cable or structural strand used to stabilize the position of a floating bridge. The condition of a floating pontoon anchor cable is evaluated during underwater inspections performed by divers and remotely operated vehicles. Condition evaluation is based on the cable protection system, breakage of wires within the cable and the condition of the cable anchor. The total element quantity should equal the number of floating pontoon anchor cables attached to the bridge.

Floating bridge anchor cables Condition Definitions: The amount of corrosion noted corresponds to the following criteria.

LIGHT (CS2) – Light surface corrosion (freckle rust, not white oxidation) and rusting of the outer layers of wires, no appreciable rust nodules or section loss detected.

LIGHT TO MODERATE – More significant corrosion with scattered rust nodules $\frac{1}{16}$ inch thick, very early stages of section loss due to occasional pitting less than $\frac{1}{32}$ inch deep.

MODERATE (CS3) – Rust nodules more uniform and typically $\frac{1}{16}$ to $\frac{1}{4}$ inch thick with more frequent section loss due to pitting, typically still less than $\frac{1}{32}$ inch deep, but with occasional pitting up to $\frac{1}{32}$ inch deep. Visually corresponds to approximately 5% section loss in outer wires.

MODERATE TO HEAVY – Uniform rust nodules typically $\frac{1}{4}$ inch thick with uniform section loss due to pitting typically $\frac{1}{32}$ inch deep. Outer wire section loss estimated between 5% and 25%.

HEAVY (CS4) – Uniform rust nodules typically $\frac{1}{4}$ inch to $\frac{3}{8}$ inch thick with uniform section loss due to pitting typically $\frac{1}{32}$ to $\frac{1}{16}$ inch deep. Visually corresponds to approximately 25% section loss to the outer wires (obvious flattening of the wires, with grooves between the wires still visible).

1. Number of cables or anchors with no defects in the cable or anchor and the galvanized protection system is functioning properly, which includes white zinc oxidation. New replacement cables are coded in this condition state. (Corresponds to NBI substructure rating of 7 or 8.)
2. Number of cables or anchors with defects that are insignificant and do not affect the capacity of the cable. The galvanized protection system is showing signs of failure, and surface or freckled rust may exist with no measurable loss of section. Any individual wire up to 75% out of lay and no closer than 30 LF apart is CS2. If any portion of the cable or anchor is CS2, then the NBI Substructure Condition rating (NBI Item 060) shall be a maximum of 6.
3. Number of cables or anchors with defects that are beginning to affect the capacity of the cable, but are within acceptable design limits. Corrosion section loss is not more than 25% of the outer wire layer. Single wire failures of the cable may exist due to corrosion or hydrogen embrittlement, but no closer than 30 feet apart. Gaps in the outer wires exposing the inner layer with no ferrous corrosion to inner layer. Multiple adjacent wires up to 100% out of lay. Wires more than 100% out of lay with second layer exposed are considered broken wires. If any portion of the cable or anchor is CS3, then the NBI Substructure Condition rating (NBI Item 060) shall be a maximum of 5.
4. Number of cables or anchors with defects that have significantly affected the capacity. Two or more broken wires, or equivalent section loss due to other defects, are within 30 feet. Outer wire section loss greater than 25%. Exposed inner wires with measurable section loss. Any cable which exhibits permanent deformation. If any portion of the cable or anchor is CS4, then the NBI Substructure Condition rating (NBI Item 060) shall be a maximum of 4. If two or more adjacent cables (on the same side or opposite sides of the pontoon) or more than four cables on the structure are CS4, then the NBI Substructure Condition rating (NBI Item 060) shall be 3.

4-5 Culverts

240	Metal Culvert	Units – LF
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This element defines a metal (steel, aluminum, etc.) culvert including arches, round or elliptical pipes, etc. The total quantity is the length of culvert from inlet to outlet along the bottom of the culvert and does not include the apron.

1. Defects are superficial and have no effect on the structural capacity of the element. There may be corrosion, erosion, scour, distortion, or roadway settlement.
2. Length of culvert with repairs.
3. Length of culvert with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Length of culvert affected by damage in locations or quantity and has reduced the structural capacity of the culvert. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to: distortion, deflection, roadway settlement, or misalignment of the barrel.

241	Concrete Culvert	Units – LF
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This element defines all precast and cast-in-place (conventional or prestressed) concrete arch, pipe and box culverts. The total quantity is the length of culvert from inlet to outlet along the bottom of the culvert and does not include the apron.

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Length of culvert with repair or patch.
3. Length of culvert affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands.
4. Length of culvert affected by damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the culvert. Structural deficiencies are not limited to: distortion, deflection, roadway settlement, or misalignment of the.

242	Timber Culvert	Units – LF
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This element defines all timber box culverts. The total quantity is the length of culvert from inlet to outlet along the bottom of the culvert and does not include the apron.

1. Defects are superficial and have no effect on the structural capacity of the element. Decay, insect infestation, cracks, splits, or checks may exist.
2. Length of culvert that has been replaced, repaired, patched, or plated.
3. Length of culvert with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Typically, locations in a load path with a shell thickness greater than or equal to 1½" are marked with a YELLOW TAG.
4. Length of culvert affected by damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted or has determined repairs are essential to restore the structural capacity of the culvert. Structural deficiencies are not limited to: distortion, deflection, roadway settlement, or misalignment of the barrel. Typically, locations in a load path with less than a 1½" shell thickness are marked with a RED TAG.

243	Other Culvert	Units – LF
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This element defines all culverts not included under steel, concrete, or timber culvert elements. It may include masonry or combinations of other materials. The total quantity is the length of culvert from inlet to outlet along the bottom of the culvert and does not include the apron.

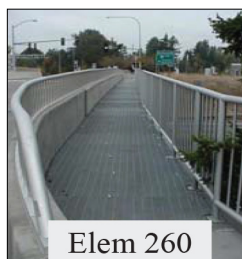
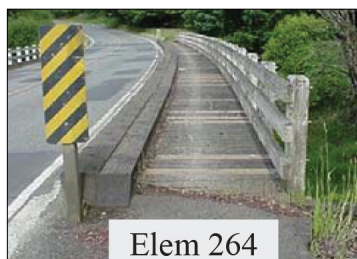
1. Defects are superficial and have no effect on the structural capacity of the culvert.
2. Length of culvert with repairs.
3. Length of culvert with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Length of culvert affected by damage in locations or quantity and has reduced the structural capacity of the culvert. Structural analysis is warranted or has determined repairs are essential to restore the structural capacity of the culvert. Structural deficiencies are not limited to: distortion, deflection, roadway settlement, or misalignment of the barrel.

4-6 Sidewalk and Supports

A sidewalk is an element that provides pedestrian access across a bridge. A sidewalk is supported by a bridge deck and/or by sidewalk brackets that consist of several types of materials. The purpose of the sidewalk BMS is to record the structural integrity of the support system and sidewalk. Identify these elements in BMS if the sidewalk width is greater than or equal to 3 feet.

However, there are exceptions that must be accommodated. When there is a true sidewalk on a bridge as determined by the design, approach sidewalks, and location, it is appropriate to enter a sidewalk element in the BMS. Timber sidewalks, for example, may be narrow and have a support system. These exceptions should include a sidewalk WSDOT element. A specific note explaining the reasoning for including the sidewalk element should be provided.

If a rail retrofit or a wide curb has been determined to NOT be a sidewalk, then Bridge Rail elements will be used to document defects.



260	Steel Open Grid Sidewalk and Supports	Units – SF
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This element defines a sidewalk constructed of steel grids that are open and unfilled. This element also includes the members used to provide support like stringers and braces. The total quantity should equal the width of the sidewalk times its length which includes sidewalk supported by structural bridge members such as a wing wall or approach slab.

261	Steel Concrete Filled Grid Sidewalk and Supports	Units – SF
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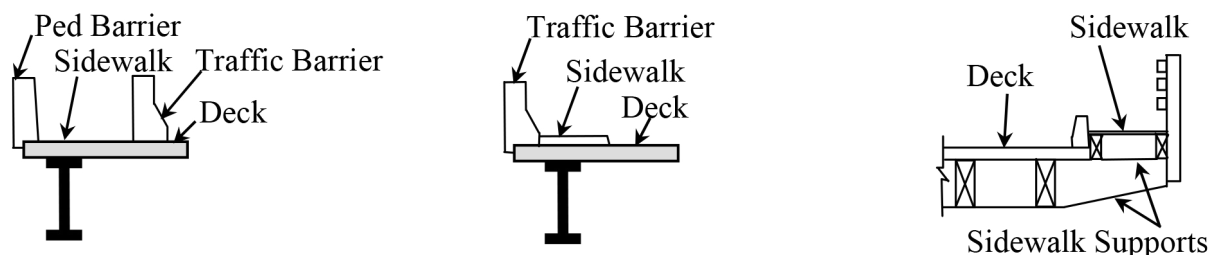
This element defines a sidewalk constructed of steel grids that have been filled with concrete. This element also includes the members used to provide support like stringers and braces. The total quantity should equal the width of the sidewalk times its length which includes sidewalk supported by structural bridge members such as a wing wall or approach slab.

262	Corrugated/Orthotropic Sidewalk and Supports	Units – SF
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This element defines a sidewalk constructed of corrugated metal filled with Portland cement concrete or asphaltic concrete or an orthotropic steel deck. This element also includes the members used to provide support like stringers and braces. The total quantity should equal the width of the sidewalk times its length which includes sidewalk supported by structural bridge members such as a wing wall or approach slab.

264	Timber Sidewalk and Supports	Units – SF
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This element defines a sidewalk constructed of timber. This element also includes the members used to provide support like stringers and braces. The total quantity should equal the width of the sidewalk times its length which includes sidewalk supported by structural bridge members such as a wing wall or approach slab.



266	Concrete Sidewalk and Supports	Units – SF
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This element defines a sidewalk constructed of reinforced concrete. The concrete sidewalk may be supported by the roadway deck, bracing, diaphragms, or sidewalk stringers. The total quantity should equal the width of the sidewalk times its length which includes sidewalk supported by structural bridge members such as a wing wall or approach slab.

267	Fiber Reinforced Polymer (FRP) Sidewalk and Supports	Units – SF
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This element defines a sidewalk constructed of fiber-reinforced polymer. This element also includes the members used to provide support like stringers and braces. The total quantity should equal the width of the sidewalk times its length which includes sidewalk supported by structural bridge members such as a wing wall or approach slab.

Condition States for WSDOT Elements 260, 261, 262, 264, 266, and 267

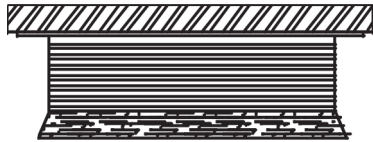
1. Defects are superficial and have no effect on the structural capacity of the sidewalk or supports.
2. Sidewalk area (or support projected area) with repairs or patches
3. Sidewalk area (or support projected area) with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Sidewalk area (or support projected area) affected by damage in locations or quantity and has reduced the structural capacity of the sidewalk support. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

4-7 Bearings

When an in-span hinge separates two structures, the joint, bearing, and seismic restrainers at the hinge will be documented in the dependent (or supported) structure only.

310	Elastomeric Bearing	Units – EA
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This element defines a bridge bearing that is constructed primarily of elastomers, with or without fabric or metal reinforcement.



311	Moveable Bearing (Roller, Sliding, etc.)	Units – EA
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This element defines those bridge bearings that provide for both deflection and longitudinal movement by means of roller, rocker or sliding mechanisms.



312	Concealed Bearing or Bearing System	Units – EA
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This element defines those bridge bearings and/or bearing seats that are not accessible with tools or equipment and therefore are not open for detailed inspection.

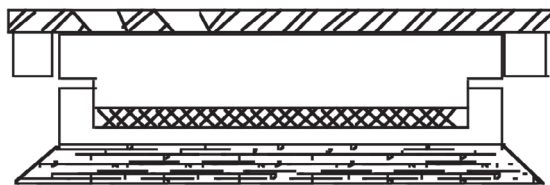
313	Fixed Bearing	Units – EA
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This element defines those bridge bearings that provide for rotation only.



314	Pot Bearing	Units – EA
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This element defines those high load bearings with a confined elastomer. The bearing may be fixed against horizontal movement, guided to allow sliding in one direction, or floating to allow sliding in any direction.



314 – Pot Bearing

315	Disc Bearing	Units – EA
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This element defines a high load bearing with a hard plastic disc. The bearing may be fixed against horizontal movement, guided to allow sliding in one direction, or floating to allow sliding in any direction.

316	Isolation Bearing	Units – EA
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This element defines a bearing that is laminated and is a sandwich of neoprene and steel plates. The bearing contains a lead core that is primarily used for seismic loads. The isolation bearing is used to protect structures against earthquake damage.

Condition States for WSDOT Elements 310, 311, 312, 313, 314, 315, and 316

1. Defects are superficial and have no effect on the superstructure movements or safe transfer of load to the substructure. Shear deformation, displacement, or cracking of grout pad may be present. Top and bottom surfaces may not be parallel.
2. Number of bearings with a repair.
3. Number of bearings with structural defects. The defects are not detrimental to the superstructure or the safe transfer of load to the substructure. Deficiencies do not warrant analysis, but may require repairs.
4. Number of bearings with defects that are detrimental to the superstructure or the safe transfer of load to the substructure. Loss of minimum bearing area may be imminent. Structural analysis is warranted or has determined bearing repairs are essential to restore the safe movement or transfer of load to the substructure.

4-8 Bridge Approach

321	Concrete Roadway Approach Slab	Units – SF
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This element defines a structural concrete slab supported at the bridge abutment and the roadway pavement. This element is essentially a concrete deck element that documents the surface conditions of the approach slab. The element quantity is the total area of both concrete approach slabs attached to the bridge. Do not include asphalt shoulder if present. Whether surface of approach slab is visible or covered by an asphalt overlay, a WSDOT element shall exist.

1. Defects are superficial. The slab surface do not have spalls/delaminations or previous repairs. The deck surfaces may have cracks or rock pockets. Wear and rutting may expose aggregate or reinforcing.
2. Slab area with repairs or patches. Do not include the rare case rutting filled with patching material.
3. Slab area with spalling. Do not add delaminations found in the field.
4. This condition state documents when an approach slab has failed and needs to be replaced. Failure is normally due to the slab falling off the bridge seat with a visible grade separation and/or excessive gap at the pavement seat. Code the total SF of approach slab in condition state 4.

322	Bridge Impact	Units – EA
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This documents an increase to the bridge live load, or impact, due to hammering or dynamic response of the bridge from trucks passing on to the bridge. Truck speed may be considered when slower speeds reduce the impact. Total quantity is based on the direction of trucks on to the bridge. Head to head traffic has two and bridges with a single direction of traffic will have one, such as ramps or main line divided structures (N&S or E&W). Code the approach roadway in the condition state that best indicates the severity of the problem. For the roadway where trucks are leaving the structure, deficiencies will be described and repairs may be called out; however, the trailing roadway will not be quantified in the condition states.

1. The number of approach roadways that are smooth. Hammer or dynamic response to the structure is not significant. There may be small bumps or minor raveling of the pavement in the approach roadway.
2. The number of approach roadways (not approach slab) that have been repaired or feather patched to correct an approach problem. If a paving project has removed the repairs, maintain the CS2 condition and note the year of the new asphalt.
3. The number of approach roadways that are rough, but the increase in live load to the structure is minor. Hammering impact is minor due to the wheels passing over surface discontinuities such as joints, cracks, or potholes. Dynamic response is minor due to a dip or rise in the approach roadway alignment.
4. The number of approach roadways that are causing significant increase in live load to the structure. Hammering impact is significant due to the wheels passing over surface discontinuities such as joints, cracks, or potholes. Dynamic response is significant due to a dip or rise in the approach roadway alignment.

4-9 Bridge Rail

WSDOT element for bridge railing are to be entered for each type of rail. For example, if there is W-beam or Thrie beam guardrail mounted on the concrete bridge rail, then the length of each metal and concrete element should be entered. If the original concrete bridge rail has aluminum rail installed on top (with or without a rail retrofit), enter that quantity into the appropriate WSDOT element as well. In the element notes, describe what type of metal bridge or pedestrian rail has been entered.

330	Metal Bridge Railing	Units - LF
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This element defines all types and shapes of metal bridge railing aluminum, metal beam, rolled shapes, etc. The quantity should equal the total length measured along each bridge rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

331	Concrete Bridge Railing	Units - LF
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This element defines all types and shapes of reinforced concrete bridge railing. The quantity should equal the total length measured along each bridge rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

332	Timber Bridge Railing	Units - LF
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This element defines all types and shapes of timber railing. All elements of this rail (except connectors) must be timber. The quantity should equal the total length measured along each bridge rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

333	Other Bridge Railing	Units - LF
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This element defines all types and shapes of bridge railing except those defined as METAL, CONCRETE or TIMBER. This element will include cable rails, and combinations of materials. The quantity should equal the total length measured along each bridge rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

Condition States for WSDOT Elements 330, 331, 332, and 333

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Bridge rail length with a repair.
3. Bridge rail length with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth), decay, or spalling.
4. Bridge rail length with damage in locations or quantity and has reduced the structural capacity of the rail. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

4-10 Pedestrian Rail

A pedestrian rail will typically be on the outside of a sidewalk and protected from traffic by a Bridge Rail.

340	Metal Pedestrian Rail	Units – LF
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This element defines all types and shapes of metal pedestrian bridge railing including steel (excluding weathering steel), aluminum, metal beam, rolled shapes, etc. The quantity should equal the total length measured along each pedestrian rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

341	Concrete Pedestrian Rail	Units – LF
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This element defines all types and shapes of reinforced concrete pedestrian bridge railing. The quantity should equal the total length measured along each pedestrian rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

342	Timber Pedestrian Rail	Units – LF
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This element defines all types and shapes of timber pedestrian bridge railing. All elements of this rail (except connectors) must be timber. The quantity should equal the total length measured along each pedestrian rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

343	Other Pedestrian Rail	Units – LF
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This element defines all types and shapes of pedestrian bridge railing except those defined as METAL, CONCRETE or TIMBER. This element will include cable rails, and combinations of materials. The quantity should equal the total length measured along each pedestrian rail within the limits of the bridge which includes rail permanently attached to structural bridge members such as the deck, a wing wall or approach slab.

Condition States for WSDOT Elements 340, 341, 342, and 343

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Pedestrian rail length with a repair.
3. Pedestrian rail length with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to impact damage, cracks, broken bolts, or measurable section loss due to corrosion (note the location and depth), decay, or spalling.
4. Pedestrian rail length with damage in locations or quantity and has reduced the structural capacity of the rail. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

4-11 Smart Flags

355	Damaged Bolts or Rivets	Units – EA
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This smart flag is used to identify superstructure steel elements that have broken or missing bolts and/or rivets. Report one unit for each occurrence in the corresponding condition state.

1. Number of damaged, missing, or loose bolts or rivets in secondary member(s).
2. Number of damaged, missing, or loose bolts or rivets has been replaced.
3. Number of damaged, missing, or loose bolts or rivets in a primary member(s).

356	Steel Cracking	Units – EA
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This smart flag is used to identify superstructure steel elements with cracks. Report one unit for each occurrence (or crack) in the corresponding condition state. If fatigue damage exists, which may warrant analysis of the element or the serviceability of the element is uncertain, contact a supervisor immediately.

1. Number of steel cracks, of any length, in a secondary member(s).
2. Number of steel cracks within a load path that have been repaired or arrested. The bridge may still be prone to fatigue.
3. Number of steel cracks within a load path that are not arrested and less than 1 inch. Any cracks (typically cope cracks) on WSDOT bridges must be repaired accordance with WSDOT Bridge Preservation Office procedures.
4. Number of steel cracks within a load path that are not arrested and 1 inch or greater in length. Any cracks (typically cope cracks) on WSDOT bridges must be repaired accordance with WSDOT Bridge Preservation Office procedures.

357	Pack Rust	Units – EA
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The primary purpose of this smart flag is to quantify steel connections where rust expansion is visually deflecting steel plates and should be addressed when the bridge is painted. Structural impacts to pack rust overstressing are recorded in the steel elements. The total quantity is the number of existing pack rust locations identified by the inspector.

1. Number of locations where visible pack rust exists and is less than ¼ inch thick.
2. Number of locations where pack rust is more than ¼ inch thick.

360	Bridge Movement	Units – EA
<p>The primary purpose of this smart flag is to identify structural movement that is causing significant distress to the bridge. Movements may be horizontal, vertical, or rotational. Evidence of movement should be documented (photo) in such a way that future measurements can determine if the structure is still moving or has stabilized.</p> <ol style="list-style-type: none"> 1. The entire bridge appears to have stabilized due to repairs or recent history of measurements. Tilt meters, piezometer tubes, or monitoring system show no movement in the past two years. 2. Bridge elements are moving but do not cause a significant problem for the bridge. Bearings may be approaching design limits. Substructure elements may be moving. 3. Bridge movement is at or beyond design limits. Investigation and repair analysis of the bridge is warranted. 		
361	Scour	Units – EA
<p>This element is used to identify foundation scour for bridges crossing waterways as observed during inspections. Its primary purpose is to identify bridge piers or abutments that are subject to scour and to provide some measure of the magnitude of that scour. Piers in normal high water are typically considered for this element but there are instances where piers above high water may be subject to scour. Maintain historical information related to scour documented in previous inspections such as measurements and/or comments of exposed footings.</p> <ol style="list-style-type: none"> 1. Number of pier/abutment foundations where no Scour exists, or where scour is superficial and has no effect on the foundations structural capacity. 2. Number of pier/abutment foundations where scour has been mitigated and the repair is functioning and in place as designed. Evaluate and comment on any riprap or other scour countermeasures that are in place. 3. Number of pier/abutment foundations where scour exists. The scour does not significantly affect the foundations structural capacity. Scour does not warrant analysis, but may require repairs. If left unchecked, could adversely impact the foundations structural capacity. <p>Scour at this level should not impact the NBI Substructure Overall rating code, item 060 (WSBIS Item 1676).</p> <p>Examples:</p> <ul style="list-style-type: none"> • Top of spread footings are exposed due to scour. • Bottom of pile caps are exposed due to scour. • Minimum known pile embedment is between 5' and 10' or the column unbraced length has increased, but does not threaten pile capacity. 		

4. Number of pier/abutment foundations with scour damage in significant locations or quantity and has reduced the foundations structural capacity. Structural analysis is warranted. Repair and or action are required to protect exposed foundation and to restore capacity to the pier.

Scour at this level may impact the NBI Substructure Overall rating code, item 060 (WSBIS Item 1676). A comment is necessary if the NBI Substructure Overall rating code is lowered.

Examples:

- Undermining of spread footings or foundation material is occurring.
- Minimum known pile embedment is less than 5' or the column unbraced length has increased and threatens pile/column capacity. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

367	Movable Bridge	Units – EA
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This is a smart flag to identify movable bridges. WSDOT elements will be used in addition to this smart flag.

1. A Movable bridge with elements that do not require repair (EA).
2. A Movable bridge with elements that require repair (EA).

368	Seismic Pier Crossbeam Bolster	Units – EA
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This element identifies concrete piers with seismic structural improvements.

1. Number of piers with a crossbeam bolster.



369	Seismic Pier Infill Wall	Units – EA
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This element identifies concrete piers with seismic structural improvements.

1. Number of piers with a seismic pier infill wall.



378	Primary Safety Inspection	Units – EA
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This is a smart flag for the Primary Safety Inspection report type, to be used when the structure is not owned by the agency performing the inspection but interacts with a route that is. Primary safety inspections only address significant safety issues on those parts of the structure that affect the route that is owned by the agency performing the inspection.

This smart flag is intended to hold all notes associated with the primary safety inspection, and the inspector should not create or edit any other inspection notes except for repair recommendations, if warranted.

Examples include:

- railroad owned structures over state or local agency routes
- locally owned structures over state routes
- state owned structures over locally owned routes

1. Report the entire bridge in condition state 1 (EA).

379	Secondary Safety Inspection	Units – EA
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This is a smart flag for the Secondary Safety Inspection report type, to be used when the structure is not owned by the agency performing the inspection but interacts with a route that is AND there is another agency that also needs to perform a safety inspection. Secondary safety inspections are otherwise similar to primary safety inspections and only address significant safety issues on those parts of the structure that affect the route that is owned by the agency performing the inspection.

This smart flag is intended to hold all notes associated with the secondary safety inspection, and the inspector should not create or edit any other inspection notes except for repair recommendations, if warranted.

Examples include:

- railroad owned structures over state AND local agency routes
- a state route crosses over a city street and a county road.

1. Report the entire bridge in condition state 1 (EA).

4-12 Seismic Restrainers

Earthquake restrainers have been installed on WSDOT bridges since the 1980s. The typical longitudinal restrainer uses epoxy coated Dywidag bars with a designed gap maintained by double nuts. An earlier system using springs to maintain the required restrainer gap was used until the early 1990s when it was discontinued as being ineffective. Gap measurements are required during an inspection if visual inspection or loose double nuts indicate the gaps are not uniform.



370	Seismic – Longitudinal Restrainer	Units – EA
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This element is used to identify longitudinal seismic restrainers. When an in-span hinge separates two structures, the joint, bearing, and seismic restrainers at the hinge will be documented in the dependent (or supported) structure only. The quantity should equal the total number of longitudinal restrainers on the bridge.

371	Seismic – Transverse Restrainer	Units – EA
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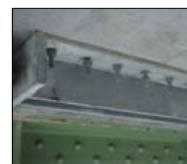
This element identifies existing bridges that have been retrofitted or newer structures that have been equipped with transverse restrainers designed to restrain transverse movement during a seismic event. The quantity should equal the total number of transverse restrainers on the bridge. When an in-span hinge separates two structures, the joint, bearing, and seismic restrainers at the hinge will be documented in the dependent (or supported) structure only. Concrete girder stops located at the ends of girders attached to the abutment or intermediate pier caps/crossbeams provide lateral restraint however it is not the intention to include these in with this element.

372	Seismic – Link/Pin Restrainer	Units – EA
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This element is used to identify link/pin seismic restrainers. When an in-span hinge separates two structures, the joint, bearing, and seismic restrainers at the hinge will be documented in the dependent (or supported) structure only. The quantity should equal the total number of link/pin restrainers on the bridge.

Condition States for WSDOT Elements 370, 371, and 372

1. Restrainer is in good condition and will function as designed. Anchor plate nuts have been checked and are in good condition.
2. Number of restrainers with misaligned seismic-longitudinal restrainer rods. Anchor plate nuts that are tight, but that have epoxy running down their bolts or are of varying lengths. The gap between adjacent longitudinal restrainers varies between $\frac{1}{4}$ inch and $\frac{3}{4}$ inch. Short transverse pipe restrainer length. Measure the depth of the diaphragm hole to the restrainer. Take a picture of the hole and tape measure.
3. Number of restrainers with improper anchor plate installation.
 Loose or inadequately bonded anchor nuts. A repair is warranted if over 25 percent of the anchor nuts have more than 2 inches of bolt thread exposed below the nut. Restrainer gap variation in a series of longitudinal seismic restrainers is greater than $\frac{3}{4}$ inches (measure and add the two gap distances on both sides of each restrainer in making your comparisons). Loose double nuts. Specify the replacement of the double nuts with (new) nuts having (with) setscrews and the resetting of the restrainer gaps according to the design tables. The inspector shall specify the required gaps, according to the bridge plans, in the repair.



373	Seismic – Catcher Block	Units – EA
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This element is used to identify a catcher block attached to a pier or abutment installed as part of a seismic retrofit. The quantity should equal the total number of catcher blocks on the bridge.

1. Number of catcher blocks in good condition.
2. Number of catcher blocks with deficiencies that need correction.

374 Seismic - Column Silo

Units - EA

I-5 N-N RAMP OVER I-5 - 5/628N-N - 0016991A



This element is used to identify when a column has been designed to be isolated from the surrounding soil during a seismic event. This will usually consist of a corrugated metal pipe buried in the ground with a cap at the base of a column. The inspection note needs to identify the individual columns that are siloed along with the planned depth (relative to an identifiable elevation) at each one. In cases with small numbers of siloed columns, that could be done in the note. In other situations, a spreadsheet attached as a file or something similar may be useful. In-depth inspections at 12-year intervals are required to confirm the system condition and functionality. In-depth inspection may require means (equipment and manpower) to open and then reclose/reseal the capping system along with tools to measure the silo depth and to roughly assess column and silo condition below the capping system. Each bridge with siloed columns may require an individual in-depth inspection procedure.

1. Silo capping system is intact as designed and is accessible with no visible deterioration.
2. Minor deterioration of silo capping system elements such as hardware corrosion, visible seal deterioration, access hardware broken/missing.
3. Capping system has been buried and is not visible for inspection. (write repair – priority 2 or higher)
4. Capping system has failed allowing solid foreign material to enter the intended gap and potentially restrict column movement. (write repair – priority 1)

375 Cathodic Protection

Units - EA

This is a smart flag used to identify a cathodic protection system used on a bridge. The quantity should equal the total number of cathodic protection systems on the bridge.

1. Code 1 if the cathodic protection system is functioning as designed.
2. Code 1 if the cathodic system is no longer functioning as designed.

376	Concrete Deck Delamination Testing	Units – SF
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This flag provides a snapshot of deck testing and must be included in the evaluation of a concrete deck and overlay. ASTM4580, Chain Drag Testing will locate and quantify the patches, spalls, delaminations not visible to the inspector and other defects on the entire top surface of the bridge deck. This information is supplemental to the deck/overlay elements and the quantities do not change. For Washington State bridges, the BMS engineer will provide the condition state quantities and notes for this element based on a Chain Drag Report produced by Design or Construction.

For decks covered with an Asphalt Overlay, the 376 data will be updated each time the asphalt is removed from the concrete surface and must be used to evaluate the deck element even though defects are not visible to the inspector. This information does not expire and the element must not be deleted from the report unless the deck is replaced or new information is provided.

1. Deck area with no delaminations.
2. For decks covered with asphalt, this quantity of patching must be recorded in the Deck CS2 and used to evaluate the deck. Do not include this quantity in the evaluation of a bare deck.
3. For decks covered with asphalt, this quantity of spalling must be recorded in the Deck CS3 and used to evaluate the deck. Do not include this quantity in the evaluation of a bare deck.
4. For concrete decks and concrete overlays, the CS4 delamination quantities must be applied to the deck/overlay element CS4. If the Chain Drag Report is more than 10 years old, then the 376 element is deleted from the report because the test results are no longer accurate and also must be removed from the evaluation of the deck/overlay element. If a Chain Drag was completed before the concrete overlay was constructed, then the 376 element must be deleted from the report since patching and delaminations are addressed during the construction.

4-13 Expansion Joint Elements

The expansion joint condition states are designed to track the criteria associated with joint structural failure such as spalling, patches, and other structural problems. A spall within 1'-0" of a joint system should be considered a joint spall and not included with the deck spalling. Spalls next to the joint are a joint deficiency rather than deck deterioration.

Missing or defective joint glands are not considered structural joint failures in the joint condition states. Some joints are designed to pass water and many joints leak within days of installation. If the joint seal leakage is causing structural problems with elements below the joint, this should be noted in the report and a repair should be recommended. A smart flag or element may be used to track this deterioration in the future, but it is not included in the joint condition states at this time.

If any portion of a joint falls into a lower condition state, code the entire length of the joint in the lower condition state. Joints with structural defects are coded in CS2. Joints that require replacement are tracked in CS3. In general, joints in Condition State 3 will be programmed for rehabilitation or replacement.

When the entire joint is replaced with a new joint system, change the WSDOT element to the new joint type. Do not use more than one WSDOT element for a joint location, unless the structure has been widened and there are two joint systems present. Joint notes should reference specific joints by pier or span number.

When an in-span hinge separates two structures, the joint, bearing, and seismic restrainers at the hinge will be documented in the dependent (or supported) structure only.

400	Asphalt Butt Joint Seal	Units – LF
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This element defines a butt joint between concrete and asphalt pavement that is an asphalt sawcut filled with hot poured rubber. This joint is shown in WSDOT Standard Plan A-40.20, Bridge Paving Joint Seals, Detail 3 or 4. This element shall also be apply for a butt joint at the end of the approach slab to extend the life of the asphalt. The quantity should equal the length measured along the joint.

1. The expansion joint is functioning as designed. Joint may not be perfect with signs of leakage. The adjacent concrete or asphalt is sound.
2. Skewed joint length at each location. "D" spalls or patches are present in the header or in the concrete within one foot of either side of the joint but no more than 10 percent of the length.
3. Skewed joint length at each location with the following typical criteria: When the concrete or asphalt must be rebuilt to maintain a reliable roadway surface; More than 10 percent of the joint length has spalls or patches adjacent to the seal; Asphalt was placed without a sawcut or the sawcut was not in the proper location.

401	Asphalt Open Joint Seal	Units – LF
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This element represents a sealed and sawcut contraction joint or a asphalt joint in bridge paving over an open concrete joint in a bridge deck or truss panel joint, as shown in WSDOT Standard Plan A-40.20, Bridge Paving Joint Seals, Detail 1, 2, 5, or 6 . The joint consists of hot poured rubber placed in an open concrete joint and a membrane may or may not exist. After the asphalt is placed, a sawcut is placed over the concrete joint and the gap filled with hot poured rubber. WSDOT Elements 402 - Open Concrete Joint and 420 - Joint Paved Over flag do not apply at these locations. The quantity should equal the length measured along the joint.

WSDOT Element 420 - the Joint Paved Over flag does apply for all locations of a buried steel joint due to the risk of planing equipment damaging the bridge deck.

1. The expansion joint is functioning as designed. Joint may not be perfect with signs of leakage. The adjacent concrete or asphalt is sound.
2. Skewed joint length at each location. "D" spalls or patches are present in the header or in the concrete within one foot of either side of the joint but no more than 10 percent of the length.
3. Skewed joint length at each location with the following typical criteria: When the concrete or asphalt must be rebuilt to maintain a reliable roadway surface; More than 10 percent of the joint length has spalls or patches adjacent to the seal; Asphalt was placed without a sawcut or the sawcut was not in the proper location.

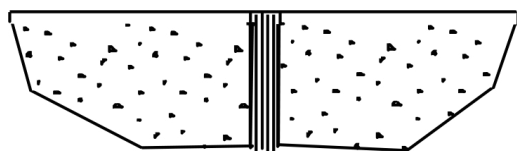
402 Open Concrete Joint**Units - LF**

This element defines a joint designed to have concrete edges at the joint opening in a concrete wearing surface. The original design is usually filled with hot poured rubber or pre-molded joint filler and the design materials may or may not be present. This joint is typical for panel joints at a truss floorbeam, interior joints on older bridges, and at the concrete roadway/approach slab joint. At the back-of-pavement seat, if a compression seal has been removed and replaced with Hot Poured Rubber (crack sealant), then quantities for the 402 element apply and the quantities for the compression seal must be reduced. The quantity should equal the length measured along the expansion joint.

This joint must not to be confused with: WSDOT Element 403 - Concrete Bulb-T joint, WSDOT Elements 405 or 406 Compression Seals with the seal missing, or WSDOT Element 417 - Rapid Cure Silicone (RCS) joint.

1. The expansion joint is functioning as designed. Joint may not be perfect with signs of leakage. The adjacent deck or header is sound.
2. Skewed joint length at each location with "D" spalls or patches are present in the header or in the deck within one foot of either side of the joint.
3. Skewed joint length at each location where the deck or headers must be rebuilt to maintain a reliable roadway surface. As a guideline, more than 25 percent of the joint length has spalls or patches in the deck or headers adjacent to the seal.

A repair to reseal the joints is required for bridges at each steel floorbeam where water is corroding the top flange and/or connections.

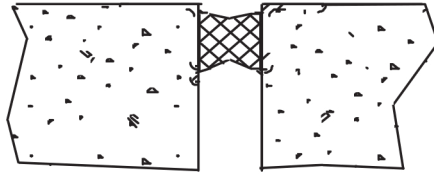
**403 Concrete Bulb-T****Units - LF**

This element defines a joint formed to accept a Bulb-T preformed seal. The seal may be missing or other materials present to provide a seal. The quantity should equal the length measured along the expansion joint.

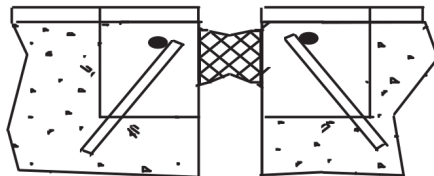


404 Compression Seal/Concrete Header**Units - LF**

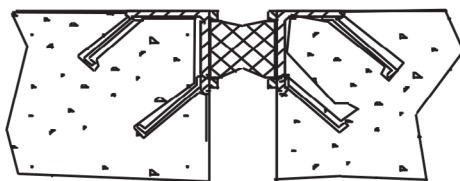
This element defines a joint with concrete headers formed during the original construction of the bridge. The joint is filled with a pre-formed compression type seal. The quantity should equal the length measured along the expansion joint.

**405 Compression Seal/Polymer Header****Units - LF**

This element defines those joints that have been rehabilitated with a polymer header and filled with a pre-formed compression type seal. The quantity should equal the length measured along the expansion joint.

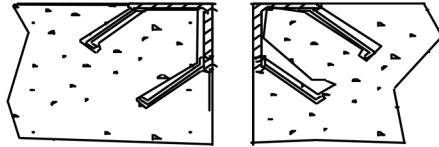
**406 Compression Seal/Steel Header****Units - LF**

This element defines a joint with steel angle plate headers that have a pre-formed compression type seal. The quantity should equal the length measured along the expansion joint.

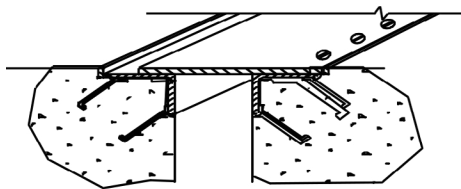


407 Steel Angle Header**Units - LF**

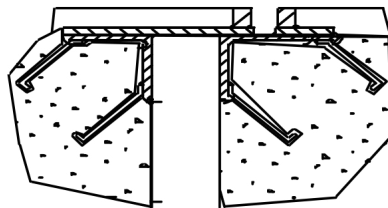
This element defines an open joint with steel angle plate headers. The quantity should equal the length measured along the expansion joint.

**408 Steel Sliding Plate****Units - LF**

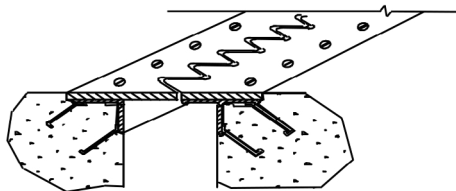
This element defines a joint with steel sliding plates. The quantity should equal the length measured along the expansion joint.

**409 Steel Sliding Plate w/Raised Bars****Units - LF**

This element defines a joint with steel sliding plates and steel raised bars welded to the plates to accommodate an overlay. The quantity should equal the length measured along the expansion joint.

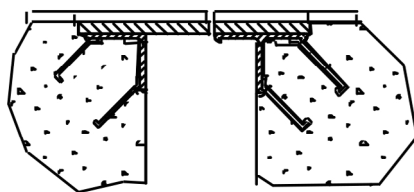
**410 Steel Fingers****Units - LF**

This element defines a joint with open steel fingers. The quantity should equal the length measured along the expansion joint.

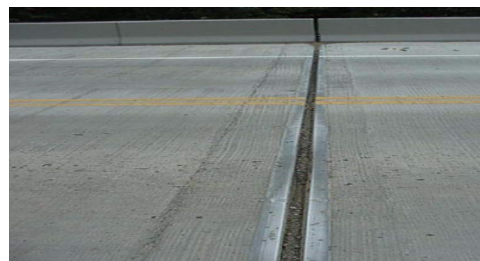
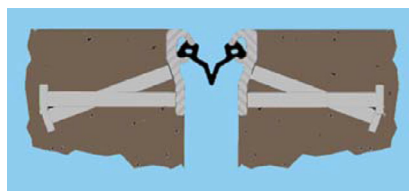


411 Steel Fingers w/Raised Bars**Units - LF**

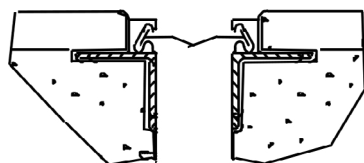
This element defines a joint with bars or plates welded to the steel finger plates to accommodate an overlay. The quantity should equal the length measured along the expansion joint.

**412 Strip Seal - Anchored****Units - LF**

This element defines an expansion joint that uses a neoprene type waterproof gland with steel extrusion or other system to anchor the gland. The steel extrusion is anchored into the concrete deck or header. The quantity should equal the length measured along the expansion joint.

**413 Strip Seal - Welded****Units - LF**

This element defines an expansion joint that uses a neoprene type waterproof gland with steel extrusion or other system to anchor the gland. The steel extrusion is welded to a pre existing steel expansion joint. The quantity should equal the length measured along the expansion joint.



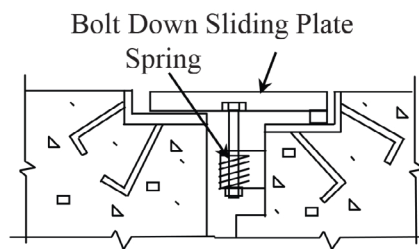
414	Bolt Down – Sliding Plate w/springs	Units – LF
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This element defines a bolted sliding plate expansion joint that uses steel springs. The quantity should equal the length measured along the expansion joint.

Condition States for WSDOT Elements 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, and 414

1. The expansion joint is functioning as designed. Joint may not be perfect with signs of leakage. The adjacent deck or header is sound.
2. Skewed joint length at each location with “D” spalls or patches present in the header or in the deck within one foot either side of the joint.
3. Skewed joint length at each location where the deck or headers must be rebuilt to maintain a reliable roadway surface or to maintain seal placement. As a guideline, more than 25 percent of the joint length has spalls or patches in the deck or headers adjacent to the seal.

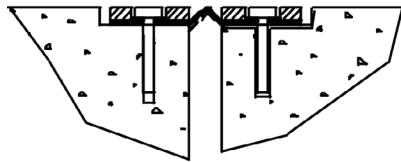
Steel Materials: Steel components are banging, cracked, loose, broken, or missing. Steel sections that have been removed and/or replaced with something else (usually concrete patching) should be CS3.



415	Bolt Down Panel – Molded Rubber	Units – LF
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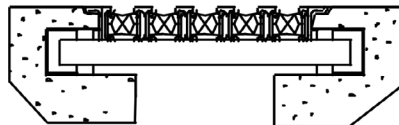
This element defines an expansion joint that uses a waterproof gland that is held in place by molded rubber panels that are attached with bolts. The quantity should equal the length measured along the expansion joint.

1. The expansion joint is functioning as designed. Joint may not be perfect with signs of leakage. The adjacent deck or header is sound. Molded Rubber panels are secure and have no defects.
2. Skewed joint length at each location with “D” spalls or patches present in the header or in the deck within one foot either side of the joint. Some of the bolts may be broken but they represent less than 10 percent of the total for that panel.
3. Skewed joint length at each location where more than 10 percent of the bolts in a panel are missing, loose, or broken. As a guideline, more than 25 percent of the joint length has spalls or patches in the deck or headers adjacent to the seal.



416	Assembly Joint Seal (Modular)	Units – LF
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This element defines a large movement joint that has an assembly mechanism with multiple neoprene type waterproof glands. The quantity should equal the length measured along the expansion joint.



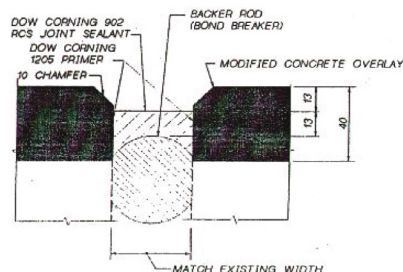
417	Silicone Rubber Joint Filler	Units - LF
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This element defines an expansion joint that has been repaired with a single or two component rubber joint filler. The quantity should equal the length measured along the expansion joint.

Condition States for WSDOT Elements 416 and 417

1. The expansion joint is functioning as designed. Joint may not be perfect with signs of leakage. The adjacent deck or header is sound.
2. Skewed joint length at each location with "D" spalls or patches present in the header or in the deck within one foot either side of the joint.
3. Skewed joint length at each location where the deck or headers must be rebuilt to maintain a reliable roadway surface or to maintain seal placement. As a guideline, more than 25 percent of the joint length has spalls or patches in the deck or headers adjacent to the seal.

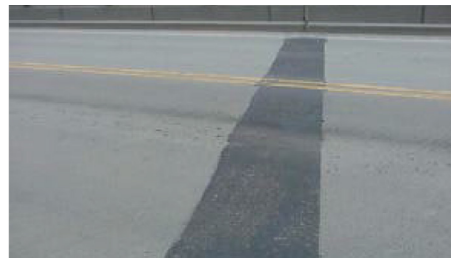
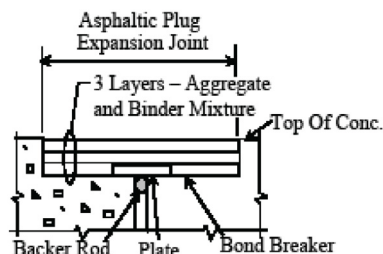
Steel Materials: Steel components are banging, cracked, loose, broken, or missing. Steel sections that have been removed and/or replaced with something else (usually concrete patching) should be CS3.



418	Asphalt Plug	Units - LF
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This element defines an expansion joint that has been replaced with an asphalt plug system. The quantity should equal the length measured along the expansion joint.

1. The expansion joint is functioning as designed. Joint may not be perfect with signs of leakage. The adjacent deck or header is sound.
2. Skewed joint length at each location with rutting in the joint is minor. "D" spalls or patches are present in the joint, or in deck adjacent to joint.
3. Skewed joint length at each location where the asphalt material in the joint has significant rutting, bulging or is missing. As a guideline, more than 25 percent of the joint length has spalls or patches in the deck or headers adjacent to the seal.

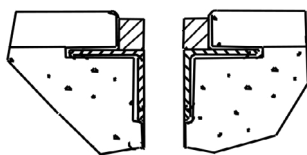


419	Steel Angle w/Raised Bars	Units - LF
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This element defines a joint with steel angles and steel raised bars welded to the angles to accommodate an overlay. The quantity should equal the length measured along the expansion joint.

1. The expansion joint is functioning as designed. Joint may not be perfect with signs of leakage. The adjacent deck or header is sound.
2. Skewed joint length at each location with "D" spalls or patches present in the header or in the deck within one foot either side of the joint.
3. Skewed joint length at each location where the deck or headers must be rebuilt to maintain a reliable roadway surface or to maintain seal placement. As a guideline, more than 25 percent of the joint length has spalls or patches in the deck or headers adjacent to the seal.

Steel Materials: Steel components are banging, cracked, loose, broken, or missing. Steel sections that have been removed and/or replaced with something else (usually concrete patching) should be CS3.



420	Joint Paved Over Flag	Units - LF
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This element identifies when a steel joint system that has been paved over with asphalt. This is a high risk to damaging the steel joint or bridge deck by the paving operations. When this flag is used, a cost for joint work will be included in the next paving contract to correct the problem. Since the joint cannot be inspected, the joint element condition states should remain unchanged (and so noted). Some steel joints may have more than 2.5" of asphalt may not require rehabilitation. The Total quantity will be the sum total length of all joint systems on the bridge.

1. Skewed joint length at each location that is paved over, but rehabilitation is not required.
2. Skewed joint length at each location that requires rehabilitation. A photo is helpful to determine the type of rehabilitation.

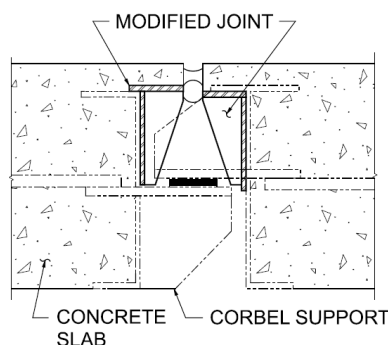
421	Concrete Slab In-Span Joint	Units - LF
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This element is defined as a modified joint at an In-Span bearing in a slab superstructure. These joints are distinct because the joint anchorages are located in concrete structurally significant to supporting slab. This joint element applies at these locations regardless of the current joint type. As of 2016, all current modified joints are RCS joints. The quantity should equal the length measured along the expansion joint.

WSDOT bridges known to have this modified s are: 5/539E&W, 5/536E&W, 5/535E, 5/537E-S, 5/537N &S, 5/537N-W, 5/538E, 5/543E&W, 5/543NCD, 5/543SCD, 5/545NCD, 5/545SCD. As with all WSDOT contracts, work that affects bridge elements will have a record in the Contract History for reference by the inspector.

1. The expansion joint is functioning as designed. Joint may not be perfect with signs of leakage. The adjacent deck or header is sound.
2. Skewed joint length at each location with "D" spalls or patches present in the header or in the deck within one foot either side of the joint.
3. Skewed joint length at each location where the deck or headers must be rebuilt to maintain a reliable roadway surface or to maintain seal placement. As a guideline, more than 25 percent of the joint length has spalls or patches in the deck or headers adjacent to the seal.

Steel Materials: Steel components are banging, cracked, loose, broken, or missing. Steel sections that have been removed and/or replaced with something else (usually concrete patching) should be CS3.

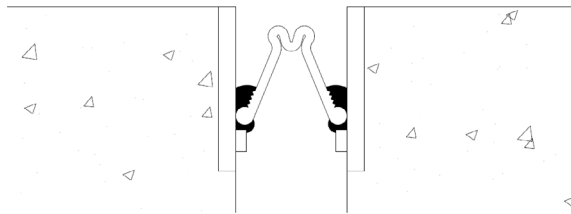


422	Flexible Joint Seal	Units – LF
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This element defines a joint with a flat extruded gland that is flexible. The gland is folded, held in place with adhesive, and may be supported by steel or concrete materials. This element supersedes other joint elements where maintenance has replaced the existing gland with a flexible joint seal. The quantity should equal the length measured along the expansion joint.

1. The expansion joint is functioning as designed. Joint may not be perfect with signs of leakage. The adjacent deck or header is sound.
2. Skewed joint length at each location with “D” spalls or patches present in the header or in the deck within one foot either side of the joint.
3. Skewed joint length at each location where the deck or headers must be rebuilt to maintain a reliable roadway surface or to maintain seal placement. As a guideline, more than 25 percent of the joint length has spalls or patches in the deck or headers adjacent to the seal.

Steel Materials: Steel components are banging, cracked, loose, broken, or missing. Steel sections that have been removed and/or replaced with something else (usually concrete patching) should be CS3.



4-14 Movable Bridges

501	Movable Bridge Steel Tower	Units – LF
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This element defines the structural steel columns and members used to support a counter weight of a vertical lift span. The total quantity is the total of the supporting column lengths.

1. Defects are superficial and have no effect on the structural capacity of the element.
2. Tower column length with repairs such as: bolts or rivets have been replaced; cracks that have been drilled or plated.
3. Tower column length with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Tower column length affected by damage in locations or quantity and has reduced the structural capacity of the column or the tower. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Structural deficiencies are not limited to impact damage, corrosion, a crack in primary load path member or in the attachment welded to primary member. Retain the quantity of the element reported in CS4 if the element is repainted but not repaired.

4-15 Other Bridge Elements

705	Bridge Luminaire Pole and Base	Units – EA
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This element is defined by a light pole and anchor system attached to a bridge. It does not include the mast arm or other types of lights that may be attached to the bridge. The condition states describe the structural condition of the pole, anchor bolts, and support. WSDOT Region maintenance may need to be contacted prior to inspection in order to remove bolt covers or otherwise provide access for inspection. The total element quantity should equal the number of luminaire poles attached to the bridge.

1. There are no significant structural defects in the pole or support, and the grout pad is solid. Poles or supports that have been replaced are coded in this condition state.
2. Number of poles where structural inspection requires special equipment to access.
3. Number of poles with structural defects. The defects do not significantly affect the structural capacity.
4. Number of poles affected by damage in locations or quantity and has reduced structural capacity. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Visual inspection indicates a base plate that is not supported by leveling nuts.



707	Fender System/Pier Protection	Units – EA
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Piers in the water can be vulnerable to rot, corrosion, and collision damage from ships or ice flows. This element is limited to external pier collision systems such as dolphins and fenders designed to resist vessels in the water. Dolphins are placed in front of a pier to re-direct an impact such as a large mass structure or pile clusters tied together. Fenders are protective fences or bumpers that surround a pier to absorb impacts from marine traffic. This element is coded separately from the pier elements and does not include extended concrete footings or coffer dams that are designed and constructed to primarily support vertical pier loads.

This element defines a protection system made of wood, steel, or concrete that is designed to protect the pier from vessel damage. The total element quantity should equal the number of piers with protection. In the case of a log boom, count the one pier connected to the boom.

1. There are no significant structural defects in the pier protection system. A protection system that has been replaced is coded in this condition state.
2. Number of pier protection systems that have been repaired.
3. Number of pier protection systems with structural defects. The defects do not significantly affect the structural capacity or function of the system.
4. Number of pier protection systems affected by damage in locations or quantity, and has reduced structural capacity. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element.

709	Ceramic Tile	Units – SF
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This is an element to identify ceramic tile. The total quantity is the area of tile visible for inspection.

1. Tile is bonded with no cracks, chips, or blemishes. Tile may be dirty but reflectivity is enhanced during regular washing operations.
2. Tile area that has been repaired.
3. Tile area that is bonded, but cracked and may have efflorescence or small amounts of section loss. Tile may be blemished from impact or other causes resulting in major loss of reflectivity.

Tile area with delaminations based on soundings, is completely missing, or has major section loss warranting replacement.

710	Bridge Mounted Sign Structures	Units – EA
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This element defines bridge mounted sign structures anchored to the bridge. This includes signs mounted to the outside face of the bridge or over the deck using a beam, truss, or cantilevered support. The condition states address any physical damage defects with the sign or its anchorage and the inventory status of the sign. The inventory status may be determined by the presence of a "Bridge Preservation Sign Structure Identification Tag". The quantity should equal the number of signs mounted to the bridge.

1. The sign has been inventoried and has the appropriate identification tag. The sign, support, and anchorage are in good condition with no significant structural defects.
2. The sign has not been inventoried. The sign, support, and anchorage are in good condition with no apparent defects.
3. The sign may or may not have been inventoried and has defects to the structure or anchorage but is safe and structural capacity has not been significantly reduced. This may include loose, missing or damaged bolts, or hardware within the sign structure where redundant framework or hardware prevents the identified defects from creating an immediate hazard. Anchorage defects may include corrosion or cracks; grout may be loose or missing. A repair should be written and the sign bridge engineer notified.
4. The sign may or may not have been inventoried. Defects to the structure or anchorage threaten or have reduced the structural capacity. This may include loose, missing or damaged bolts, or hardware in multiple locations, and cracks within structural sections. Anchorage defects may include loose, missing or broken hardware, broken or delaminating anchor locations, or loss of embedment due to creep or pull out. An emergent repair should be specified with written notification to region maintenance and the sign bridge engineer.

4-16 WSDOT Bridge Deck Overlay Elements

WSDOT categorizes overlays in to two different types. The first type consists of Asphalt Concrete Pavement (ACP) and Thin Overlays, are a deck protection systems intended to prolong the life of the deck by removing the traffic wear from the surface of the concrete deck. The second type is a Concrete Overlay which is intended to rehabilitate the deck and provide a new concrete wearing surface.

ACP Overlays are represented by the WSDOT element 800 can generally be identified in the field where as WSDOT element 801 represents asphalt with a membrane that is not visible. Thin overlays may be identified in the field if the system has failed and chunks are missing. Deterioration of the ACP and thin overlays is not generally associated with the deterioration of the deck. The ACP may be replaced several times without exposing the concrete deck and the condition states for the deck and overlay elements are independent and DIFFERENT. Paving contracts attempt to repair all concrete spalls and delaminations on WSDOT bridges before placing the overlay. If the area of patching/spalls/delams is known, then the quantity should be noted and recorded in the WSDOT concrete deck element as CS2, CS3 or CS4 respectively; while the Overlay quantities of CS2 and CS3 are based on the visible inspection of the surface. In a similar fashion, if a new Bituminous Surface Treatment (BST) has been applied to an asphalt surface, then the overlay element CS2 and CS3 are equal to zero.

800	Asphalt Concrete (AC) Overlay	Units – SF
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This element defines an Asphalt Concrete (AC) bridge deck overlay, with or without a Bituminous Surface Treatment (BST). The quantity should equal the overlay's width times the length.

801	Asphalt Concrete (AC) Overlay With Waterproofing Membrane	Units – SF
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This element defines an asphaltic concrete with waterproofing membrane bridge deck overlay. The quantity should equal the overlay's width times the length.

802	Thin Polymer Overlay	Units – SF
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This defines a thin polymer bridge deck overlay that is less than or equal to 0.5 inches in thickness (i.e., epoxy, methyl-methacrylate). The quantity should equal the overlay's width times the length.

Condition States for WSDOT Elements 800, 801, and 802

1. Defects are superficial. The deck surfaces have no spalls/delaminations or previous repairs. The deck surfaces may have cracking.
2. Total area of overlay patches.
3. Total area of overlay spalls or potholes. Thin Polymer Overlays (802) may have visible delaminations and should be considered as spalls and coded in CS3.

Concrete Overlay elements are difficult to discern in the field and are identified in special provisions or Plans. When constructing modified concrete overlays, the material removed by the deck preparation (spalls and delams) is replaced with the overlay material. WSDOT considers this construction deck rehabilitation; or in other words, the concrete overlay and deck are monolithic. Therefore, CS2 and CS3 for the deck and concrete overlay will be the SAME. All defects noted in the concrete overlay (SF) apply to the deck. It is not uncommon to have the overlay break up when there is a problem in the deck below it.

803	Modified Concrete Overlay	Units – SF
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This defines a rigid modified concrete bridge deck overlay that is normally 1.5 inches or greater in thickness (i.e., Latex (LMC), Microsilica (MMC), Fly Ash (FMC)). The quantity should equal the overlay's width times the length.

804	Polyester Concrete Overlay	Units – SF
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This defines a rigid polyester concrete bridge deck overlay that is normally 0.75 inches in thickness. The quantity should equal the overlay's width times the length.

Condition States for WSDOT Elements 803 and 804

1. Defects are superficial. The deck surfaces have no spalls/delaminations or previous repairs. The deck surfaces may have hairline cracks or rock pockets.
2. Concrete overlay area with repairs or patches. Do not include the rare cases of rutting that has been filled with patching material.
3. Concrete overlay area with spalling.
4. Record the delaminated area (CS4) from WSDOT element 376 in the overlay CS4. If new delaminations are found, do not add delaminations found in the field unless approved by Bridge Management. Chain Drag testing by the Bridge Inspector must chain the entire deck, record the results in a Chain Drag Report available on the Bridge Website under Bridge Overlays, and send the file to Bridge Management.

805	AC Over a Polymer Overlay	Units – SF
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This defines an asphaltic concrete applied over a thin polymer bridge deck overlay (i.e., epoxy, methyl-methacrylate). The quantity should equal the overlay's width times the length.

1. Defects are superficial. The deck surfaces have no spalls/delaminations or previous repairs. The deck surfaces may have cracking.
2. ACP overlay area with patches.
3. ACP overlay area with spalls or potholes.

806	BST on Concrete (Chip Seal)	Units – SF
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This defines a Bituminous Surface Treatment (BST), or commonly known as a chip seal, mistakenly applied directly on a concrete deck and is to be removed. This severely limits the inspection of the deck. Code the area of BST covering the concrete deck in CS1.

Note: Element 800 or 801 is used when a chip seal is intentionally applied to a structure. WSDOT discontinued use of this element in the year 2012.

807	Asphalt Concrete (AC) Overlay W/High Performance Membrane	Units – SF
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This element is defined as asphaltic concrete overlay with a higher quality waterproof membrane on a bridge deck. These membranes are spray-on polymers that cover rough surfaces or bridge decks that are considered significant. The condition states are based on the overlay, not the membrane. The quantity should equal the overlay width times the length.

As of 2016, there are three WSDOT bridges with this element: 16/110W, 5/504W, and 5/814.



1. Defects are superficial. The deck surfaces have no spalls/delaminations or previous repairs. The deck surfaces may have cracking.
2. Total area of overlay patches.
3. Total area of overlay spalls or potholes.

4-17 Protective Coatings

The steel paint area is equal to the surface area of the steel members in the bridge. An estimate of the steel paint area may be made if bridge plans are not available but the steel tonnage is known. The following table provides an approximate conversion factor:

Bridge Type	Square Feet Per Ton
Rolled or Plate Girder	110
Truss	160

901	Red Lead Alkyd Paint System	Units – SF
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This paint protection system is a 3-coat alkyd system incorporating lead based paint. Use this paint element as a default if the paint was installed prior to 1991.

902	Inorganic Zinc/Vinyl Paint System	Units – SF
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This paint protection system consists of an inorganic zinc silicate shop applied primer system and a vinyl is paint applied after erection, cleaning, and spot priming.

903	Inorganic Zinc/Urethane Paint System	Units – SF
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This paint protection system consists of a inorganic zinc silicate shop applied primer system and an epoxy, aliphatic urethane paint system applied after erection, cleaning, and spot priming. **This paint system is used on new WSDOT steel bridges.**

904	Organic Zinc/Urethane Paint System	Units – SF
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This paint protection system is a 3-coat system incorporating an organic zinc primer, an epoxy second coat and a moisture cured urethane topcoat.

905	Coal Tar Epoxy Paint System	Units – SF
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This paint protection system incorporates a coal tar epoxy based product.

906	Metalizing	Units – SF
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This protection system consists of a sprayed coating of zinc or zinc/aluminum.

907	Galvanizing	Units – SF
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This protection system consists of zinc applied to steel in a variety of spray-on methods.

908	Epoxy Paint for Weathering Steel	Units – SF
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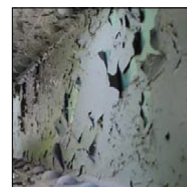
This protection system consists of a clear epoxy coating applied to weathering steel to prevent excessive corrosion.

909	Zinc Primer	Units - SF
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This paint protection system consists of a zinc silicate shop applied primer system.

Condition States for WSDOT Elements 901 thru 909

1. The protection system is sound and functioning as intended to protect the metal surface.
2. Protection system area that has been painted by maintenance.
3. Protection system area with chalking, peeling, curling or showing other early evidence of paint system distress, but there is no exposure of metal.
4. Protection system area that is no longer effective.
The metal substrate is exposed.



910	Weathering Steel Patina	Units - SF
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This protection system consists of a chemical compound formed on the surface of weathering steel elements and is called the patina. When exposed to the atmosphere, weathering steel develops a patina, which seals and protects the steel from further corrosion. This oxide film is actually an intended layer of surface rust, which protects the member from further corrosion and loss of material thickness. The patina acts like a paint system to protect the steel. The color is an indicator of the condition of the patina may vary from orange to dark brown or purple-brown.

1. Weathering steel area that is chocolate brown or purple brown in color (boldly exposed) and in good condition. The patina is tightly adhered, capable of withstanding hammering or vigorous wire brushing. The patina system is sound and functioning to protect the metal surface.
2. Weather steel area that has been painted by maintenance.
3. Weathering steel color is yellow orange to light brown. Some areas may not have rust. Patina has a dusty to granular texture.
4. Weathering steel area that is black in color indicating non-protective patina. Area that remains damp for long periods of time due to rain, condensation, leaky joints, traffic spray or other source of moisture. Area where debris has accumulated on a horizontal surface and the steel is continuously wet. Area with a texture of large granules (greater than 1/8" diameter); flaking (greater than 1/4" diameter) or laminar rusting in thin sheets.



5-1 General

The National Bridge Inspection Standards (NBIS) requires a load rating be calculated for each reportable bridge* as well as a scour evaluation for any reportable structure over water. Temporary structures that will be in service for more than 90 days shall be load rated as well as assessed for scour.

The load rating calculations and scour evaluations are a permanent part of the bridge file and are to be updated when the condition of the bridge changes. All load rating calculations and new and updated Scour analysis shall be stamped, signed, and dated by a registered professional engineer.

**Bridge is intended to mean all reportable structures which includes bridges, culverts and tunnels.*

5-2 Bridge Load Rating

Load rating of bridges shall be completed per *Bridge Design Manual* (BDM) Chapter 13 and the AASHTO Manual for Bridge Evaluation (MBE). See BDM Section 13.4 for summary sheets and information included in the Load Rating Report. See the appendix in the MBE for examples of load rating different types of structures. Newly discovered or transfer of ownership of bridges shall have load ratings completed and data entered into the inventory within 90 days.

5-2.1 General Load Rating and Re-Rating Guidelines

- The Load rating of new bridges shall be completed within 90 days of opening the structure to the traveling public in the anticipated final configuration.
- The ratings of existing bridges shall be re-examined when the "Revise Rating Flag" is turned on. The condition of identified bridge elements shall be reviewed and the load ratings shall be updated if needed. In cases where the capacity of a member is reduced significantly, such as impact damage to a girder with loss of reinforcing or damage to steel members, ratings shall be updated within 30 days. In other cases such as increase in dead load, a preliminary assessment can be made based on the increase in dead load, condition of the structure and existing ratings. If in the engineer's judgment, the ratings will not be affected significantly, and will not require a need to post or lower the load restriction on the bridge, ratings should be updated within 12 months, however, the decision and findings shall still be documented in the Load Rating File.

Load ratings of structures shall be reviewed and updated if necessary every 12 years. Factors to be reviewed to assess the need for updating the rating should be changes in the design code or changes in the load rating criteria as well as the criteria listed in Section B, below. For State bridges, a field in the load rating database with the initials of the reviewer and the date of the review shall be filled out.

For State owned bridges, the Risk Reduction Engineer shall provide a list of outstanding load ratings to the Bridge Preservation Engineer on a monthly basis. The list can be generated thru a query in the Load Rating database.

5-2.2 Bridge Load Rating Revision Criteria

WSBIS Item 2688, Revise Rating should be coded as “Y” when one or more of the following items apply:

1. The Superstructure or Cross-beams/ Floor-beams Elements' State condition changes from either Condition State 1, 2 or 3 to Condition State 4, or Superstructure or Substructure NBI code changed to 4 or less.
2. If the approach condition to the structure causes severe impact to the bridge, call for a high priority repair to fix the approaches so the transition onto the structure is smooth.
3. If the deck has potholes on the surface or at the joints, call for a high priority repair to patch the potholes in the deck at the joints.
4. The thickness of the overlay has increased.
5. The railing is replaced with a heavier traffic barrier.
6. New utilities such as water main or sewer line have been installed on the structure.
7. The number of striped lanes has increased on 2 line superstructure members such as trusses or 2-line girder bridge, and box girder bridges.
8. Damaged or deficient structural elements have been repaired/ replaced, such as replacement of timber caps or girders or replacement or repair of damaged girders due to high load hits or other deterioration.

When a deficiency is observed in the field such as rot pockets in timber or section loss in a steel member, the inspector should provide the following items to assist in providing accurate rating factors:

1. The description “shell thickness” shall state whether the thickness is all around the member or on one side and whether it is full depth and location.
2. Section loss in steel members shall include, if possible, the remaining section thickness, location of the section loss and required dimensions.

Provide a sketch of the deficient member and show deterioration as stated above and provide the dimensions of the deteriorated area. It is of great importance to provide as accurate information as possible instead of estimates. Posting or restricting a bridge is greatly dependent on this information.

The load rating engineer shall write a comment under “Note 11” addressing the “Revise Rating” flag. The comments should state whether the ratings were updated based on the Inspector’s findings or that no need for updating the rating with the reasoning.

5-2.3 Bridges With Unknown Structural Components

For concrete and masonry bridges with no design plans, and when the necessary reinforcing details are unknown and cannot be measured, load capacity ratings may be determined based on field inspection by a qualified bridge inspector followed by evaluation by a qualified engineer. Such a bridge does not need to be posted for load restrictions if it has been carrying normal traffic for an appreciable period of time and shows no sign of distress; Reference the AASHTO *Manual for Bridge Evaluation* (MBE) second edition, Sections 6.1.4 and 6A.8.1.

General rating guidelines for these structures are:

- Inventory rating shall be equal to the design truck at the time the bridge was constructed. Operating rating shall be equal to the inventory rating multiplied by 1.667.
- Legal trucks rating factors shall be equal to 1 when the Superstructure, Substructure, or culvert NBI code is equal or greater than 5. Restriction of permit loads shall be assessed.
- Posting or restricting of a bridge shall be assessed when NBI code of the superstructure, substructure or culvert is 4 or less or when there are signs of structural distress.

The Load Rating Methods WB1551 and WB1554 shall be coded as “0”, Administrative.

Full documentation for an administrative rating shall be placed in the bridge load rating file.

The table below shows typical design loads and the era they were utilized. The information in the table is based on State bridge inventory and it is dependent on the class of highway.

	Design Load in Tons	Design Era
H-10	10	Early 1900- mid 20's
H-15	15	Mid 1910's-Mid 1960's
H-20	20	Mid 1910's-1920's
HS-15	27	Mid 1940's-Late 60's
HS-20	36	Mid-1940's- Early 2000's

*Administrative ratings imply ratings based on Field evaluation and Documented Engineering Judgment.

5-2.4 Data Management

The WSBIS database shall be updated within 30 days from the completion and approval of a load rating of a structure.

5-2.5 Posting Requirements

Posting of a structure shall occur when the Operating rating factor for any of the legal loads is less than 1 based on the Load Factor or Allowable Stress Methods or the rating factor for any of the legal loads is less than 1 based on the Load and Resistance Factor Method. Legal loads in the State consist of the three AASHTO legal trucks, Type 3 (Single Unit), Type 3S2 (Truck-Semi Trailer) and Type 3-3 (Truck Trailer), the SUV's (SU4, SU5, SU6 and SU7). Emergency Vehicles EV2 and EV3 are also considered legal loads on the Interstate and within one road mile from the interstate per FHWA Memo dated November 3, 2016.

Agencies generally post a bridge between the Inventory Rating and the Operating Rating using the Load Factor Method and Allowable Stress Methods. The minimum permissible posting value is three tons at inventory or operating levels. Bridges not capable of carrying a minimum gross live load of three tons shall be closed. Follow the MBE for calculating the posting limits.

In general, posting of a structure, when warranted, shall occur as soon as possible but not to exceed 90 days from the time posting requirements have been verified and within 60 days from the date of the posting letter is sent to the region by the Statewide Program Manager. In instances where the load carrying capacity of a bridge is significantly reduced, such as by impact to the structure, posting or closing of the bridge shall occur as soon as it is determined it is not safe to carry legal vehicular loads.

When possible, additional tests such as concrete strength or steel yield strength shall be performed to validate the assumption in the load rating analysis, hence mitigate the need for posting or restriction of the bridge. Strengthening or repair of an element should also be considered to eliminate the need for posting or restriction.

Load Posting Signs for structures where needed, shall follow the Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT *Sign Fabrication Manual* M 55-05. See Exhibit 5-1 through Exhibit 5-3 for additional signage information.

All bridges requiring load posting also require additional advance posting signs in advance of the nearest intersecting roads, ramps or a wide point in the road where a driver can detour or turn around.

Exhibit 5-1 AASHTO Legal Trucks Posting

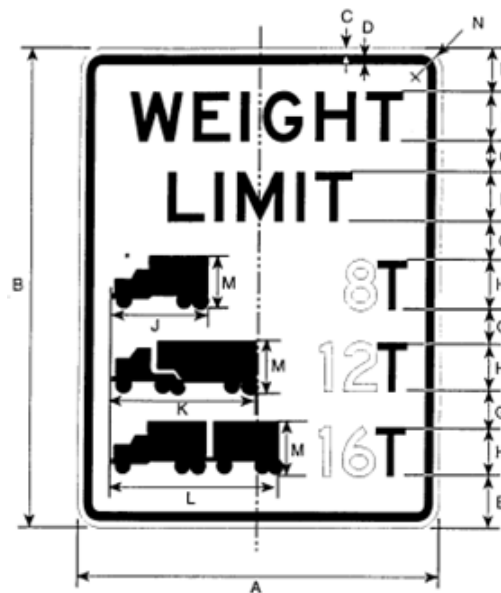


Exhibit 5-2 Emergency Vehicles Posting

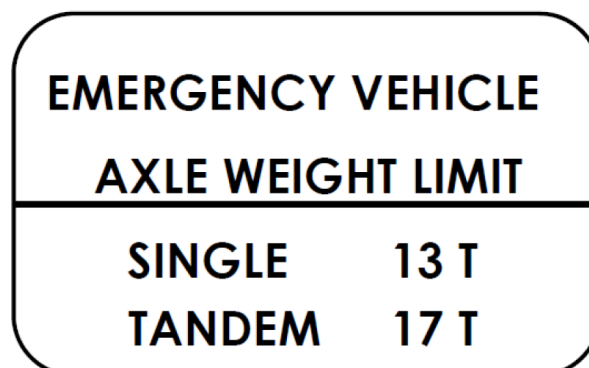
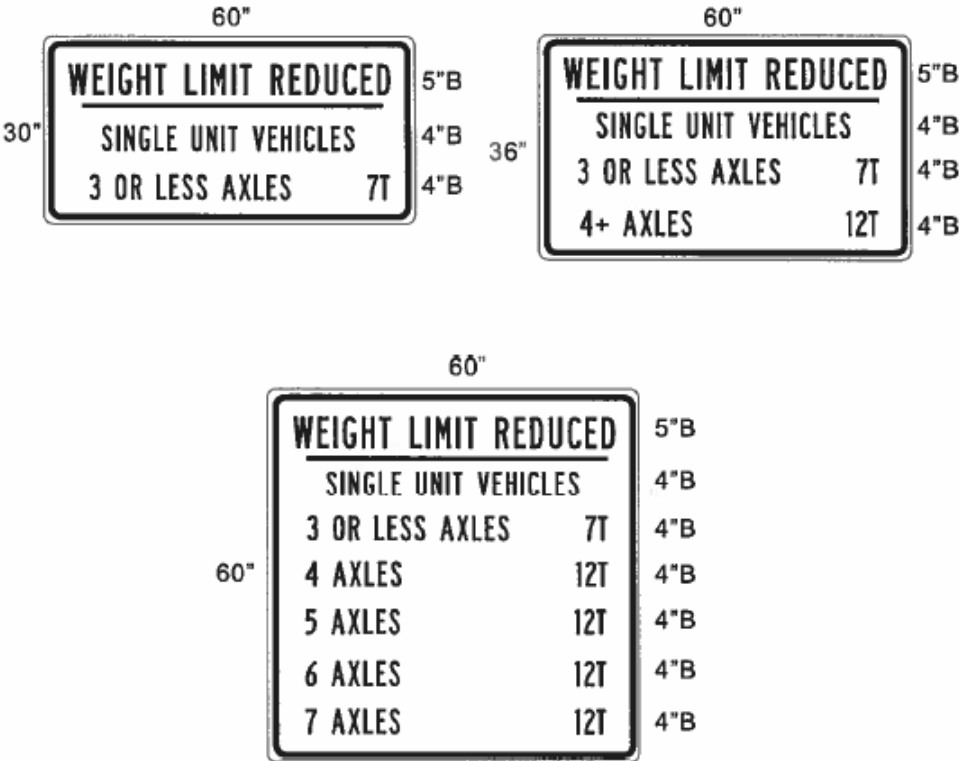


Exhibit 5-3 SUV Posting Signs



7/8" Border, 5/8" Margin, Corner Radius 2-1/4"

COLORS

LEGEND & BORDER - BLACK (NON-REFL)
BACKGROUND - WHITE (REFL)

5-2.6 Overload Permits

Overweight loads traveling over state or local agency roads are required to obtain permits/ approval from the state, county, or city maintaining those roadways. No permit loads shall be allowed over posted bridges. The first step in evaluating a permit is to determine if the configuration meets RCW 46.44 for maximum gross weight, load per axle, or axle group (E-Snoopi) is a tool on WSDOT Commercial Vehicle website is used to calculate axle weight per RCW). The second step is to evaluate the structures on the traveled route. This can be accomplished in two methods.

The first method, which is more precise for a specific structure, is to model the permit load moving on the bridge and calculating its load rating factor. A single lane distribution factor can be used in the model, which means that no other trucks are permitted in the adjacent lanes. A rating factor equal to or above 1 means the permit truck can safely travel over the particular structure. Permit loads that have unusual configuration or have more than 8 tires per axles shall be evaluated using this method.

The second method is more general and the engineer shall be extremely cautious when applying it to ensure that the permit load is enveloped by one of the typical rated trucks. The method calculates the maximum weight per axle allowed over a bridge and is dependent on the load rating factors for the particular structure, as follows:

- **Truck Type SA**

Definition: Construction Equipment Tires (a.k.a., Super Single Axle) (RCW 46.44.091(3))

Range: Up to 45,000 lbs. per axle.

Criteria: Using the Load Rating Factor for the Overload 1 Truck (a.k.a., OL1), which has a dual axle weighing 43,000 lbs., the equation is 45,000 lbs. * Rating Factor * 43/45 rounded to the nearest 500 lbs.

- **Collection Truck (RCW 46.44.041) Restriction List Truck Type S/A**

Definition: Two-axle trucks where the rear drive axle is the item in question on non-interstate routes only.

Range: Up to 26,000 lbs. on rear axle.

Criteria: Using the Load Rating Factor for the AASHTO1 Truck (a.k.a., Type 3), which has a dual axle weighing 34,000 lbs., the equation is **26,000 lbs.** * Rating Factor * 26/34 rounded to the nearest 500 lbs.

- **Truck Type T/D**

Definition: Three-axle trucks where the rear tandem drive axles are the item in question on non-interstate routes only.

Range: Up to 42,000 lbs. on rear dual.

Criteria: Using the Load Rating Factor for the AASHTO1 Truck (a.k.a., Type 3), which has a dual axle weighing 34,000 lbs., the equation is **42,000 lbs.** * Rating Factor * 34/42 rounded to the nearest 500 lbs.

- **Tow Truck (RCW 46.44.015) Restriction List**

Truck Type: Tow truck with tandem (dual) drive axles.

Definition: Three axle tow truck with tandem drive axles towing a variety of vehicles.

Range: Up to 48,000 lbs. on drive dual axles.

Criteria: Using the Load Rating Factor for the AASHTO2 Truck (a.k.a., Type 3S2), which has dual weighing 31,000 lbs., the equation is **48,000 lbs.** * Rating Factor * 31/48 rounded to the nearest 500 lbs.

- **Truck Type CL8**

Definition: Class 8 Short Hitch five-axle combination (three-axle tractor with a two-axle trailer).

Range: Up to 21,500 lbs. per axle in dual group and 20,000 to 22,000 for a single axle.

Criteria: Use the Load Rating Factor for the OL1 Truck based on single lane distribution factor. The equation is **22,000 lbs.** * Rating Factor rounded to the nearest 500 lbs.

- **Truck Type BL**

- Definition:** Big load six plus axle combination and three to four axle single units.
- Range:** Up to 22,000 lbs. per axle in dual and tridem groups and up to 22,000 lbs. for a single axle.
- Criteria:** Use the Load Rating Factor for the OL2 Truck based on a single lane distribution factor. The equation is **22,000 lbs. * Rating Factor * Modifying Factor (MF)*** rounded to the nearest 500 lbs. In some instances engineering judgment may be used in establishing restrictions on a structure.
- *Modifying Factor (MF) is 1.15 if Superstructure or Substructure Condition is 6 or above; 1.10 for Condition of 5 and 1 for 4 or less. The MF is applicable to concrete and steel members. For timber members the MF is 1.

For permits traveling over State routes, WSDOT can request the weighing of a permit load at any time, however, here are typical triggers:

- Analysis shows that the load is close to overstressing one or more bridges.
- Multiple load requests: 10 or more loads in the 200-300 thousand pound range.
- 5 or more loads over 300 thousand pounds.
- Any load over 500,000 pounds.

Commentary: *The SA load is assumed to act as a tandem axle due to the size of the tire. The occurrence of these permitted loads are occasional, hence, the OL1 was used to envelope these vehicles due to the lower Live Load Factor instead of the Type 3S2 which was previously used.*

The MF multiplier applied to the BL is used since the OL2 is an envelope truck and is not permitted in the State. The Engineer shall use the MF with extreme caution and it shall not be applied to every permit load. The previous methodology which applied a Multiplier Factor based on the number of lanes is not valid any longer.

5-3 Scour Evaluation

All bridges spanning waterways are required by the NBIS to have a scour evaluation. A scour evaluation is done to identify the susceptibility to erosion of streambed material and the degree of foundation element stability. The evaluation should include as-built foundation details, current condition of the foundation, a stream bed cross section profile, and stream flow rates. The initial evaluation is a screening tool to evaluate the susceptibility of a structure to scour. If a structure is found to be vulnerable to scour, an analysis shall be performed by a professional engineer with hydraulics expertise to assess the scour issues or identify the proper repairs/countermeasures.

As the bridge foundation condition changes and/or the stream bed characteristics change, the scour criticality may have to be reanalyzed. Scour evaluations shall be reviewed and updated every 12 years, if necessary.

Upon determining that a bridge is scour critical, the agency needs to develop a written plan of action (POA) to monitor, mitigate, or close the bridge. For additional information, see FHWA HEC 18 Evaluating Scour at Bridges.

Scour evaluations of new bridges completed during the design phase that are provided to the Scour Engineer shall be entered into the data inventory within 90 days of the structure being open to traffic. Newly discovered or transfer of ownership of bridges shall have scour evaluation completed and entered into inventory within 12 months.

5-3.1 *Determining Susceptibility to Scour*

Each bridge's susceptibility to scour damage must be determined to be either:

1. Stable for calculated scour conditions (scour code 8, 7, 5, 4).
2. Scour critical (scour code 3, 2, 1, 0).
3. Scour risk cannot be determined due to unknown foundations (scour code U)
4. Tidal water that has not been evaluated for scour, but considered low risk (scour code 5) or appropriate scour code of U if foundations are unknown.

See FHWA coding guide revision at www.fhwa.dot.gov/engineering/hydraulics/policymemo/revguide.cfm.

The results of the scour evaluation are to be recorded by the scour engineer in the Scour Summary Sheet (See Section 5-4) and to be placed in the scour files. Upon completion of all scour evaluations, there should not be any bridges with a code "6." The completed scour evaluations, information required to do the evaluation, and the best mitigation option for the bridge in question are to be incorporated into the permanent bridge scour file.

Scour Code	Soundings Flag Max. Frequency (months)
2	12
3	24
U	24
4	24
5	72
7	72
8	72

The soundings frequency for State bridges can be changed by the Scour Engineer as needed based on field observations. The list of bridges that require soundings for State bridges is created by the Scour Engineer and provided to the Information Group within BPO no later than December 31st of each year to be added to Bridge Works.

5-3.2 *Action Plans for Scour Critical Bridges*

For each bridge that has been determined to be scour critical, a POA shall be developed to identify the appropriate measures necessary to monitor and/or to make the bridge less vulnerable to damage or failure due to scour. The POA is to provide specific direction as to essential actions required at the site for region field staff and inspectors to observe and take the appropriate action without further communication. It should have details of who to contact after a bridge has been closed due to the specified event. Whatever action is to be taken it must be documented in the POA in sufficient detail that is easy to follow and thorough enough that field personnel can make appropriate decisions without higher approval.

Region field staff inspecting the condition of susceptible elements must have authority to close the bridge and know how to conduct an emergency closure. They must have the

necessary equipment with them to take this action at the time of the determination without leaving the bridge or calling for assistance.

The two primary components of the POA are instructions regarding the triggering event and frequency of inspections to be made at the bridge, and a schedule for the timely design and construction of scour countermeasures (see Section 5-4 for WSDOT and FHWA POA templates). The POA's for WSDOT are updated by the Scour Engineer as needed when condition changes warrant it, and they are stored on BEIS.

The POA should include:

- Physical site identification (bridge, route, stream, etc.); features that are vulnerable (approach roadway, pier/s, pier orientation/beginning of bridge)
- Hydrologic and Hydraulic Characteristics (water surface elevation needed if appropriate to the event type and characteristics.)
- Party responsible for decision on closure/reopen.
- Responsible party contact information.
- Trigger mechanisms for closure and opening. On-site water surface elevation marked on piers or abutments such that field crews can observe them from river bank.
- Detour routes
- Communication to public (detour signage, law enforcement, press, etc.)
- Records of mitigation in place (quarry spall, weirs, mats, barbs, etc.) with photo and original dimensions for future examination and reference. This information to be made available to inspectors and region field staff to utilize during inspections and flood events.

When monitoring is deemed appropriate there are basic components that should be incorporated as listed above. Depending on the risk or consequence of failure, greater detail may be warranted.

Monitoring – It is important that all scour critical bridges be monitored during and after flood events. The POA should include specific instructions to bridge inspectors or maintenance workers on what to look for, at what locations, and methods of inspection to use. Guidance should also be included as to when a bridge should be closed to traffic. Agencies should also develop and inform appropriate personnel of bridge closure procedures. The intensity of the monitoring effort is related to the risk of the scour hazard, as determined from the scour evaluation. Some of the items to consider when developing the monitoring plan include:

- Amount of existing rotational movement or settlement of substructure units
- Degree of streambed degradation, aggradation, or lateral movement
- Recommended procedures and equipment for taking measurements of streambed elevations (rods, probes, weights, portable sonic equipment, etc.)
- Instructions for inspecting existing countermeasures such as riprap, dikes, barbs, mats, etc.
- Guidance on maximum permissible scour depths, flood flows, water surface elevations, etc. beyond which the bridge should be closed to traffic
- Instructions for checking the operation of fixed scour monitoring devices
- Reporting procedures for conditions that warrant bridge closure. Establish the chain of command with authority to close bridges.
- Forms and procedures for documenting inspection results and instructions regarding follow-up actions when necessary

Temporary Countermeasures – Temporary countermeasures provide a degree of protection for scour critical bridges. They may prevent damage for most flows, but are sacrificial, low-cost treatments that help insure the safety of a bridge during normal flood events. Use of such measures may postpone the need to close a bridge during high flows. Temporary countermeasures, such as riprap, should not be viewed as an alternative to monitoring, but rather as a supplement.

Permanent Countermeasures – Permanent countermeasures are engineered to make a bridge safe from damage due to scour. A variety of methods exist including channel improvements, structural strengthening or underpinning, drop structures, relief bridges or constructing additional spans. These types of fixes would eliminate the bridge from being “scour critical,” but are more costly. Agencies prioritize permanent countermeasures to address the most critical needs as funds permit.

5-3.3 **Recording Bridge Scour Information**

The completed bridge scour evaluation shall include the resulting WSBIS 1680 scour code, the information required to do the evaluations, and the written action plan to mitigate scour risk if appropriate. The evaluation is to be incorporated into the permanent bridge scour file for the bridge. Any changes to bridge inventory data should be accomplished within 90 days after the evaluation or field review are complete. The scour monitoring information or schedule should be communicated to all affected parties.

Fields that relate to bridge hydraulics and/or scour are:

- Waterway Adequacy Appraisal- WSBIS 1662 (NBI Item 71)
- Substructure Condition - WSBIS 1676 (NBI Item 60)
- Channel Protection - WSBIS 1677 (NBI Item 61)
- Pier/Abutment Protection – WSBIS 1679 (NBI Item 111)
- Scour – WSBIS 1680 (NBI Item 113)

5-3.4 Scour Analysis

The procedure for analyzing stream stability and scour shall be per HEC Publications (see Exhibit 5-4) which could involve the following three levels of analysis:

- **Level 1** – Application of simple geomorphic concepts and other qualitative analyses
- **Level 2** – Application of basic hydrologic, hydraulic and sediment transport engineering concepts.
- **Level 3** – Application of mathematical or physical modeling studies

Data Needs for Level 1 Qualitative and Other Geomorphic Analyses – The data required for preliminary stability analyses include maps, aerial photographs, notes, and photographs from field inspections, historic channel profile data, information on human activities, and changes in stream hydrology and hydraulics over time.

A flowchart of the typical steps in qualitative geomorphic analyses is provided in Exhibit 5-5.

The six steps are generally applicable to most stream stability problems. As shown in the figure, the qualitative evaluation leads to a conclusion regarding the need for more detailed (Level 2) analysis or a decision to complete a screening or evaluation based on the Level 1 analysis. A Level 1 qualitative analysis is a prerequisite for a Level 2 engineering analysis for bridge design or rehabilitation.

Exhibit 5-4 Scour and Stream Stability Analysis

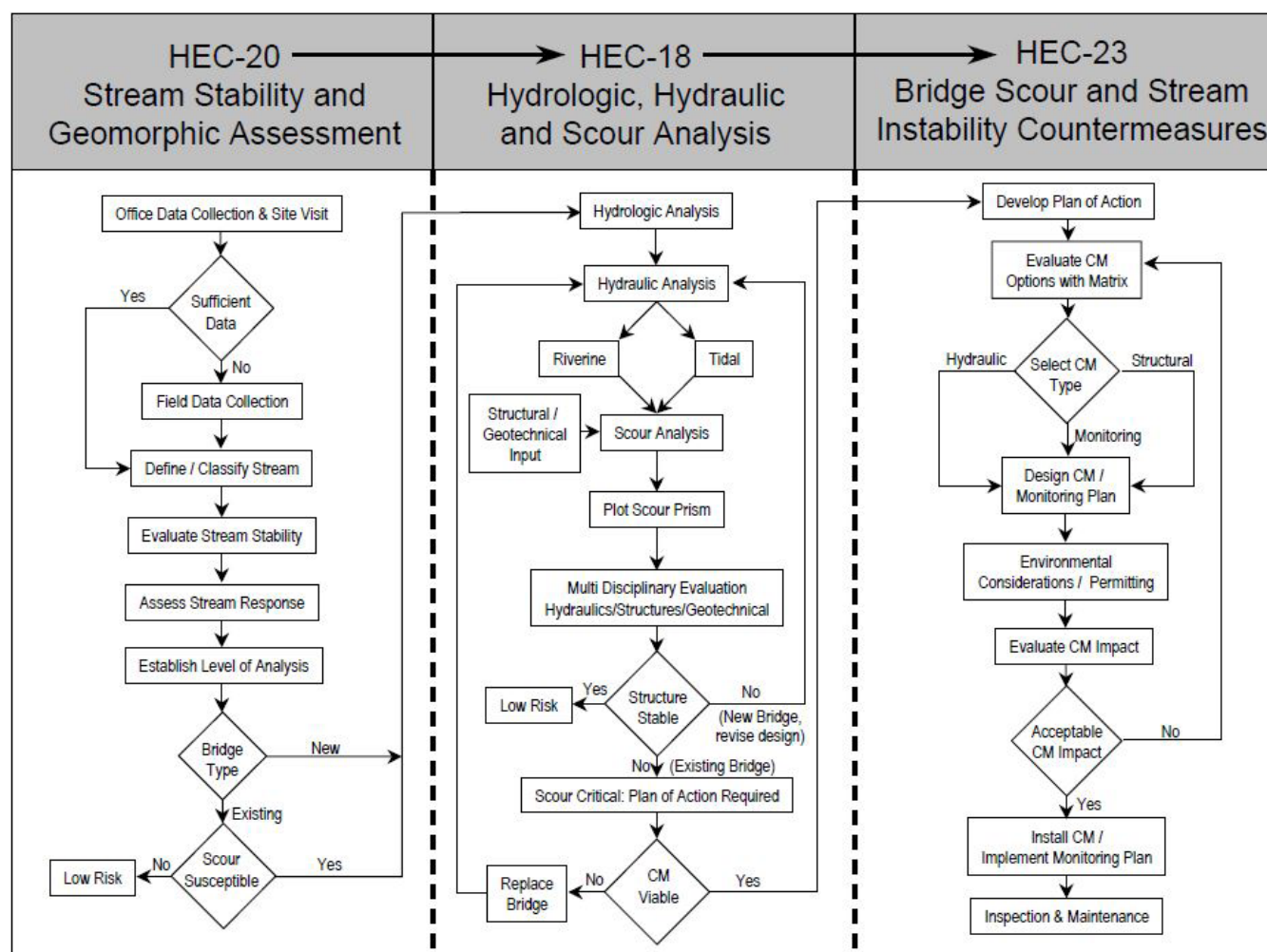
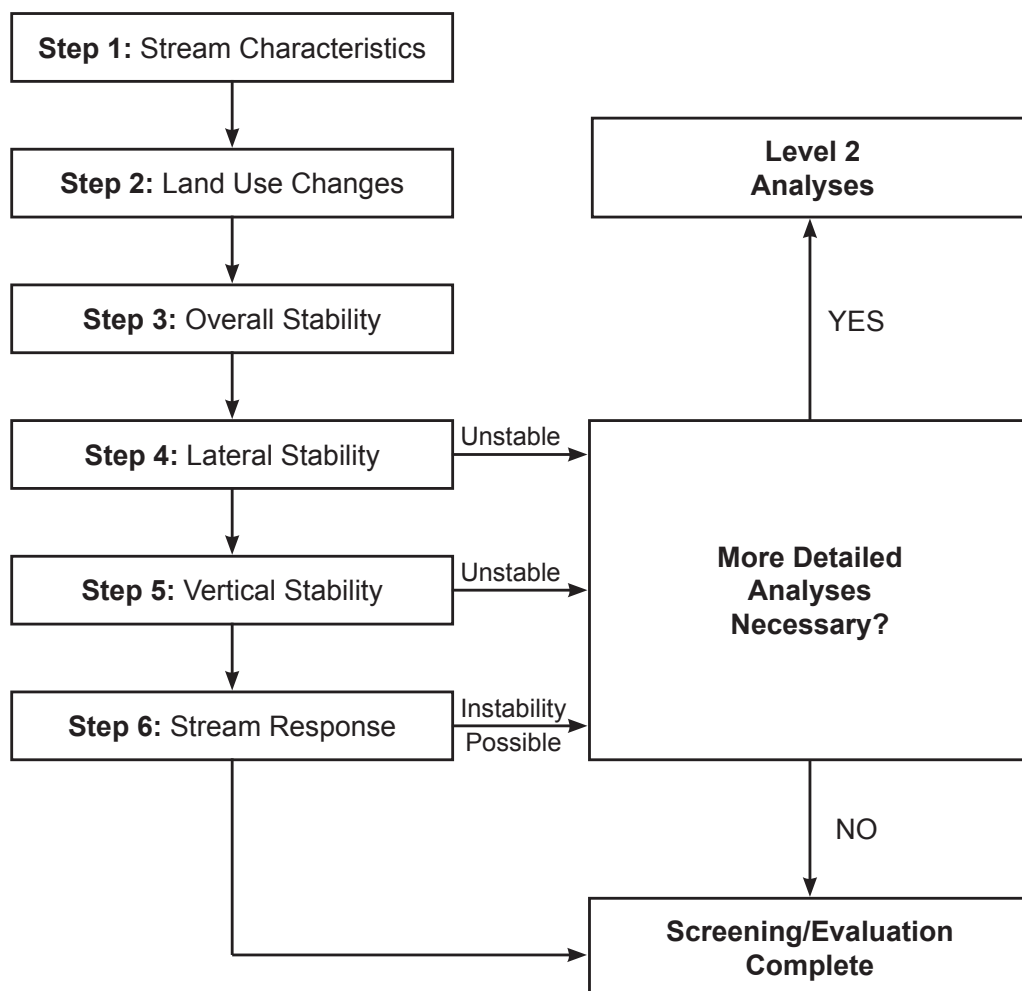


Exhibit 5-5 Level 1 Analysis

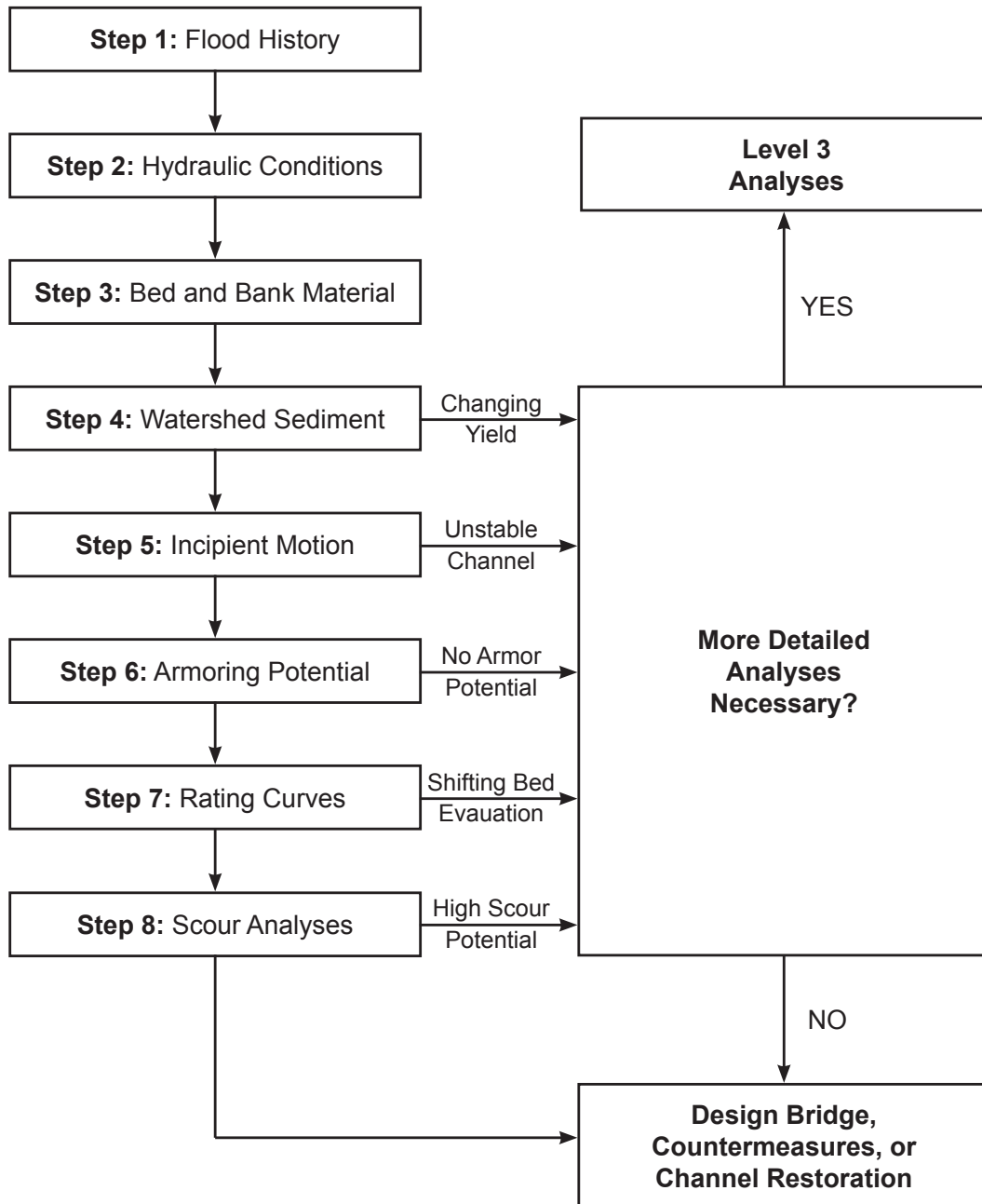


Data Needs for Level 2 Basic Engineering Analyses – Data requirements for basic hydrologic, hydraulic and sediment transport engineering analyses are dependent on the types of analyses that must be completed. Hydrologic data needs include dominant discharge (or bankfull flow), flow duration curves, and flow frequency curves. Hydraulic data needs include cross sections, channel and bank roughness estimates, channel alignment, and other data for computing channel hydraulics, up to and including water surface profile calculations. Analysis of basic sediment transport conditions requires information on land use, soils, geologic conditions, watershed and channel conditions, and available measured sediment transport rates (e.g., from USGS gauging stations).

More detailed quantitative analyses require data on the properties of bed and bank materials and field data on bed-load and suspended-load transport rates. Properties of bed and bank materials that are important to a study of sediment transport include size, shape, fall velocity, cohesion, density, and angle of repose.

Level 3 analyses are performed by a professional engineer with hydraulic expertise (see Exhibit 5-6).

Exhibit 5-6 Level 2 Analysis



5-4 Appendices

Appendix 5-A	WSDOT Scour Summary Sheet
Appendix 5-B	WSDOT Plan of Action Template
Appendix 5-C	Instructions for Completing WSDOT Plan of Action
Appendix 5-D	FHWA Plan of Action Template
Appendix 5-E	Instructions for Completing FHWA Plan of Action

Appendix 5-A

WSDOT Scour Summary Sheet

SCOUR SUMMARY SHEET									
Bridge Number:									
Waterway									
Scour Code									
Owner									
SID								Place PE Stamp Here	
Analyzed By:									
Date of Analysis:									
Q100 (cfs)				Q100 Water Surface Elev. (ft.)					
Q500 (cfs)				Q500 Water Surface Elev. (ft.)					
V100 (ft./sec)				V500 (ft./sec)					
Angle of Attack				Thalweg Elevation					
Superstructure Low Point (pt. obstructs water flow) Elev. (ft.)									
Q When High Water Touches Bottom of Bridge if less than Q500 (cfs)									
Scour Analysis									
Pier Number		Bottom of Foundation Elev. (ft.)		Calculated Scour Elev. (ft.)		Monitor (UW, R, F)		Inspection Frequency	
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
<u>Mitigation</u>					In Place and Functioning (Y/N)				
Description of Mitigation									
<u>Comments</u>									
<u>Frequencies:</u>									
<u>Type of Inspection</u>		<u>Frequency (years)</u>			<u>Year Frequency Established</u>				
Stream Cross Section from U/S Rail									
Underwater									
Fathometric									

SCOUR CRITICAL BRIDGE - PLAN OF ACTION

Structure ID	Brg No	Bridge Name
Region	Route	Mile Post
Owner	Last Inspection Date	
Waterway	Brg Length	Main Span Appr Spans

Foundations:

Subsurface soil information: ☐ Non-Cohesive ☐ Cohesive ☐ Rock

Date POA Modified:

Modified By:

Title:

Does the bridge provide service to emergency facilities and/or an evacuation route? ☐ ☐ N/A

SCOUR VULNERABILITY

NBIS coding :

Scour Code NBIS	Item 113 WS 680
Substructure NBIS	Item 60 WS 676
Channel Protection	Item 60 WS 677
Waterway Adequacy	Item 71 WS 662

Source of Scour Rating ☐ Observed ☐ Assessment ☐ CalculatedScour
Evaluation
Summary:

9 Note:

361 Note:

677 Note:

680 Note:

Scour Critical Elements:

RECOMMENDED ACTION(S)

a. Flood Monitoring Program	<input type="checkbox"/> Yes <u>Recommended</u>	<input type="checkbox"/> No	<input type="checkbox"/> Yes <u>Implemented</u>	<input type="checkbox"/> No
b. Hydraulic/Structural Countermeasures	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No

MONITORING PROGRAM

☐ Regular Inspection Program ☐ w/ cross sections

Items to Watch:

☐ Underwater Inspection Program

Items to Watch:

☐ Flood Monitoring Program ☐ Visual Inspection☐ Flood monitoring required during event:

Flood monitoring event defined by (check all that apply):

<input type="checkbox"/> Discharge	<input type="checkbox"/> Stage
<input type="checkbox"/> Elevation measured from	
<input type="checkbox"/> Flood warning system:	

Frequency of flood monitoring:

Post-flood monitoring required: ☐ within

Frequency of post-flood monitoring:

Criteria for termination of flood monitoring:

Agency and Department responsible for monitoring:

Contact
Number

COUNTERMEASURE RECOMMENDATIONS

Countermeasure
implementation
project type:

Contact person:

Target design completion date:

Target construction completion date:

Countermeasures
already completed:

BRIDGE CLOSURE PLAN

Scour monitoring criteria for consideration of bridge closure:

Agency and department responsible for closure:

Closure contact name:

Criteria for reopening the bridge:

Person responsible for Re-opening bridge after inspection:

DETOUR ROUTE

Detour route description (route number, from/to, distance from bridge, etc.) :

Bridges on Detour Route:

Traffic control equipment (detour signing and barriers) and locations(s):

News release, other public notice (include authorized person(s), information to be provided and limitations):

Scour Files (From BEIST)

Appendix 5-C *Instructions for Completing WSDOT Plan of Action*

SECTION 1: General Information

- The general bridge information is usually available via BEIS or from Bridge Works.
- Subsurface soil information is available from boring logs or site visits.
- Included under this section is whether the bridge provides service to emergency services or is a part of an evacuation route.
- POA updates (date, person, and title) provided here.

SECTION 2: Scour Vulnerability

- NBI codes 1680, 1676, 1677, and 1682 obtained from most recent bridge inspection report via a query.
- Source of scour rating (observed, assessment, or calculated) defined.
- The Scour Evaluation Summary lists pier foundation elevations and calculated scour elevations when available.
- The bridge inspection notes 9, 361, 1677, and 1680 are obtained from the most recent bridge inspection report via a query.
- The scour critical bridge elements are listed in this section.

SECTION 3: Recommended Actions

- Check boxes determine whether a flood monitoring program and hydraulic/structural countermeasures have been recommended and/or implemented.

SECTION 4: Monitoring Program

- Regular and underwater inspection programs items to watch as well as cross sections included (under regular inspections).
- Flood monitoring program and visual inspection (during the flood) check boxes listed in this section.
- Flood monitoring required during the event checkbox. Provided with region input.
- Flood monitoring definition checkboxes listed (discharge, stage, elevation measured from, flood warning system).
- Flood elevations tied to bridge structure when possible.
- Specific USGS river gauge listed.
- Flood monitoring and post flood monitoring frequencies listed. These frequencies are provided by the regions.
- Criteria for flood monitoring termination stated.
- Agency, department responsible for flood monitoring along with contact information listed.

SECTION 5: Countermeasure Recommendations

- Countermeasure implementation project type as well as targeted design and construction completion dates provided. A list of completed scour countermeasures is included here.
- Scour engineer contact information listed here.

SECTION 6: Bridge Closure Plan

- Scour monitoring criteria (flood elevations, debris piles, obvious bridge distress) listed for consideration of bridge closure.
- Agency, department, closure contact information listed here.
- Criteria for reopening bridge, person responsible for reopening bridge (BPO engineer) contact information listed.

SECTION 7: Detour Route

- Detour route description (route number, distance from bridge) provided by regions.
- Bridges on detour route along with any load or geometric restrictions provided by regions.
- Traffic control equipment (signing and barriers) and locations provided by region maintenance.
- News releases, other public notices including authorized persons provided by region public relations.

SECTION 8: Scour files

- Electronic scour file locations listed.

Appendix 5-D FHWA Plan of Action Template

SCOUR CRITICAL BRIDGE - PLAN OF ACTION			
1. GENERAL INFORMATION			
Structure number: _____	City, County, State: _____		Waterway: _____
Structure name: _____	State highway or facility carried: _____		Owner: _____
Year built: _____	Year rebuilt: _____	Bridge replacement plans (if scheduled): _____ Anticipated opening date: _____	
Structure type: <input type="checkbox"/> Bridge <input type="checkbox"/> Culvert			
Structure size and description: _____			
Foundations: <input type="checkbox"/> Known, type: _____ Depth: _____ <input type="checkbox"/> Unknown			
Subsurface soil information (check all that apply): <input type="checkbox"/> Non-cohesive <input type="checkbox"/> Cohesive <input type="checkbox"/> Rock			
Bridge ADT: _____	Year/ADT: _____	% Trucks: _____	
Does the bridge provide service to emergency facilities and/or an evacuation route (Y/N)? _____ If so, describe: _____			
2. RESPONSIBILITY FOR POA			
Author(s) of POA (name, title, agency/organization, telephone, pager, email): _____ Date: _____			
Concurrences on POA (name, title, agency/organization, telephone, pager, email): _____			
POA updated by (name, title, agency, organization): _____ Date of update: _____ Items update: _____			
POA to be updated every _____ months by (name, title, agency/organization): _____ Date of next update: _____			
3. SCOUR VULNERABILITY			
a. Current Item 113 Code: <input type="checkbox"/> 3 <input type="checkbox"/> 2 <input type="checkbox"/> 1 Other: _____			
b. Source of Scour Critical Code: <input type="checkbox"/> Observed <input type="checkbox"/> Assessment <input type="checkbox"/> Calculated Other: _____			
c. Scour Evaluation Summary: _____			
d. Scour History: _____			

4. RECOMMENDED ACTION(S) (see Sections 6 and 7)				
	<u>Recommended</u>		<u>Implemented</u>	
a. Increased Inspection Frequency	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
b. Fixed Monitoring Device(s)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
c. Flood Monitoring Program	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
d. Hydraulic/Structural Countermeasures	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No

5. NBI CODING INFORMATION		
	<u>Current</u>	<u>Previous</u>
Inspection date		
Item 113 Scour Critical		
Item 60 Substructure		
Item 61 Channel & Channel Protection		
Item 71 Waterway Adequacy		
Comments: (drift, scour holes, etc. - depict in sketches in Section 10)		

6. MONITORING PROGRAM	
<input type="checkbox"/> Regular Inspection Program Items to Watch: _____	<input type="checkbox"/> w/surveyed cross sections
<input type="checkbox"/> Increased Inspection Frequency of ____ mo. Items to Watch: _____	<input type="checkbox"/> w/surveyed cross sections
<input type="checkbox"/> Underwater Inspection Required Items to Watch: _____	
<input type="checkbox"/> Increased Underwater Inspection Frequency of ____ mo. Items to Watch: _____	
<input type="checkbox"/> Fixed Monitoring Device(s) Type of Instrument: _____ Installation location(s): _____ Sample Interval: <input type="checkbox"/> 30 min. <input type="checkbox"/> 1 hr. <input type="checkbox"/> 6 hrs. <input type="checkbox"/> 12 hrs. <input type="checkbox"/> Other: _____ Frequency of data download and review: <input type="checkbox"/> Daily <input type="checkbox"/> Weekly <input type="checkbox"/> Monthly <input type="checkbox"/> Other _____ Scour alert elevation(s) for each pier/abutment: _____ Scour critical elevations(s) for each pier/abutment: _____ Survey ties: _____ Criteria of termination for fixed monitoring: _____	

☐ **Flood Monitoring Program**

Type: ☐ Visual inspection
☐ Instrument (*check all that apply*):
☐ Portable ☐ Geophysical ☐ Sonar ☐ Other: _____
 Flood monitoring required: ☐ Yes ☐ No
 Flood monitoring event defined by (*check all that apply*):
☐ Discharge _____ ☐ Stage _____
☐ Elev. measured from _____ ☐ Rainfall _____ (in/mm) per _____ (hour)
☐ Flood forecasting information: _____
☐ Flood warning system: _____
 Frequency of flood monitoring: ☐ 1 hr. ☐ 3 hrs. ☐ 6 hrs. ☐ Other: _____
 Post-flood monitoring required: ☐ No ☐ Yes, within _____ days
 Frequency of post-flood monitoring: ☐ Daily ☐ Weekly ☐ Monthly ☐ Other: _____
 Criteria for termination of flood monitoring: _____
 Criteria for termination of post-flood monitoring: _____
 Scour alert elevation(s) for each pier/abutment: _____
 Scour critical elevation(s) for each pier/abutment: _____

Note: Additional details for action(s) required may be included in Section 8.

Action(s) required if scour alert elevation detected (*include notification and closure procedures*): _____

Action(s) required if scour critical elevation detected (*include notification and closure procedures*): _____

Agency and department responsible for monitoring: _____

Contact person (include name, title, telephone, pager, e-mail): _____

7. COUNTERMEASURE RECOMMENDATIONS

Prioritize alternatives below. Include information on any hydraulic, structural or monitoring countermeasures.

☐ **Only monitoring required (see Section 6 and Section 10 – Attachment F)**

Estimated cost \$ _____

☐ **Structural/hydraulic countermeasures considered (see Section 10, Attachment F):**

Priority Ranking

Estimated cost

(1) _____	\$ _____
(2) _____	\$ _____
(3) _____	\$ _____
(4) _____	\$ _____
(5) _____	\$ _____

Basis for the selection of the preferred scour countermeasure: _____

Countermeasure implementation project type:

☐ Proposed Construction Project ☐ Maintenance Project
☐ Programmed Construction - Project Lead Agency:
☐ Bridge Bureau ☐ Road Design ☐ Other _____

Agency and department responsible for countermeasure program (if different from Section 6 contact for monitoring): _____

Contact person (include name, title, telephone, pager, e-mail): _____			
Target design completion date: _____			
Target construction completion date: _____			
Countermeasures already completed: _____			
8. BRIDGE CLOSURE PLAN			
Scour monitoring criteria for consideration of bridge closure:			
<input type="checkbox"/> Water surface elevation reaches _____ at _____ <input type="checkbox"/> Overtopping road or structure <input type="checkbox"/> Scour measurement results / Monitoring device (See Section 6) <input type="checkbox"/> Observed structure movement / Settlement <input type="checkbox"/> Discharge: _____ cfs/cms <input type="checkbox"/> Flood forecast: _____ <input type="checkbox"/> Other: <input type="checkbox"/> Debris accumulation <input type="checkbox"/> Movement of riprap/other armor protection <input type="checkbox"/> Loss of road embankment			
Emergency repair plans (include source(s), contact(s), cost, installation directions): _____			
Agency and department responsible for closure: _____			
Contact persons (name, title, agency/organization, telephone, pager, email): _____			
Criteria for re-opening the bridge: _____			
Agency and person responsible for re-opening the bridge after inspection: _____			
9. DETOUR ROUTE			
Detour route description (route number, from/to, distance from bridge, etc.) - Include map in Section 10, Attachment E.			
Bridges on Detour Route:			
Bridge Number	Waterway	Sufficiency Rating/ Load Limitations	Item 113 Code
Traffic control equipment (detour signing and barriers) and location(s): _____			
Additional considerations or critical issues (susceptibility to overtopping, limited waterway adequacy, lane restrictions, etc.) : _____			

News release, other public notice (include authorized person(s), information to be provided and limitations): _____

10. ATTACHMENTS

Please indicate which materials are being submitted with this POA:

- ☐ Attachment A: Boring logs and/or other subsurface information
- ☐ Attachment B: Cross sections from current and previous inspection reports
- ☐ Attachment C: Bridge elevation showing existing streambed, foundation depth(s) and observed and/or calculated scour depths
- ☐ Attachment D: Plan view showing location of scour holes, debris, etc.
- ☐ Attachment E: Map showing detour route(s)
- ☐ Attachment F: Supporting documentation, calculations, estimates and conceptual designs for scour countermeasures.
- ☐ Attachment G: Photos
- ☐ Attachment H: Other information: _____

Appendix 5-E Instructions for Completing FHWA Plan of Action

The existing bridge management system in your state will provide much of the information required to fill out this template.

Note: All blocks in this template will expand automatically to allow as much space as you require. All fields can be modified to accommodate local terminology, as desired. Where check boxes are provided, they can be checked by double-clicking on the box and selecting the “checked” option. If you include additional attachments, please indicate this in Section 10.

Section 1

Foundations – It is recommended that substructure depths be shown in the bridge elevation, Attachment C (see Section 10). The minimum depth should be reported in Section 1 as a worst-case condition.

Subsurface Soil Information – If conditions vary with depth and/or between substructure units, this should be noted and included in Attachments A and/or C (see Section 10).

Sections 1, 2, 3, and 4

These sections are intended as an executive summary for the reviewer/manager who may not need the details of Sections 5 through 10, and show:

- **Section 1** – General information
- **Section 2** – Who prepared the POA
- **Section 3** – The source of the problem
- **Section 4** – What actions are recommended and their status

Section 3

Reasons why the bridge has been rated scour critical for Item 113:

Scour Critical

- Aggressive stream or tidal waterway (high velocity, steep slope, deep flow).
- Actively degrading channel.
- Bed material is easily eroded.
- Large angle of attack ($> 10^\circ$).
- Significant overbank or floodplain flow (floodplain > 50 m or 150 feet wide).
- Possibility of bridge overtopping (potential for pressure flow through bridge).
- Evidence of scour and/or degradation.
- Evidence of structural damage due to scour.
- Foundations are spread footings on erodible soil, shallow piles, or embedment unknown.
- Exposed footing in erodible material.
- Exposed piles with unknown or insufficient embedment.
- Loss of abutment and/or pier protection.
- No countermeasures or countermeasures in poor condition.
- Needs countermeasures immediately.

Unknown Foundations

- No record of foundation type (spread footing vs. piles).
- Depth of foundation or pile embedment unknown.
- Condition of foundation or pile embedment unknown.
- Subsurface soil strata not documented.

Section 5

This section highlights recent changes in the scour/hydraulics coding items as an indication of potential problems or adverse trends. See FHWA Policy Memorandum on Revision of Coding Guide, Item 113 - Scour Critical Bridges dated April 27, 2001, for details on Items 113 and 60 which can be found at www.fhwa.dot.gov/engineering/hydraulics/policymemo/revguide.cfm.

Section 6

Multiple individuals responsible for various monitoring activities may be listed, as appropriate.

Section 7

Guidance on the selection and design of scour countermeasures may be found in FHWA Hydraulic Engineering Circular No. 23, Bridge Scour and Stream Instability Countermeasures, Second Edition, 2001. To facilitate the selection of alternative scour countermeasures, a matrix describing the various countermeasures and their attributes is presented in this circular and can be found at <http://isddc.dot.gov/olpfiles/fhwa/010592.pdf>.

Section 8

Standard closure and reopening procedures, if available, may be appended to the POA (see Section 10, Attachment H).

Section 9

In some situations, public transportation (e.g., bus routes) may be of importance to the public, and therefore could be included in the POA (see Section 10, Attachment).

6-1 General

The purpose of this chapter is to provide consistent procedures for reporting bridge repair needs and following up on bridge repair work performed. FHWA has general reporting requirements related to critical findings (discussed later), but otherwise leaves the tracking of repair and maintenance to the owning agency.

Recommendations for repairs arising from bridge inspections range from preventive maintenance that will preserve the life of the structure by slowing down the processes of deterioration, to routine repairs that correct existing minor problems, to critical repairs that must be undertaken immediately to restore service or safeguard the public. The ability to identify and track bridge repair needs and to follow the status of repairs is a vital element of a quality bridge management program. Bridge program managers rely on accurate, timely information provided by concise reports and thorough procedures. The following sections outline both the reports to use and procedures to follow for various types of repair and maintenance needs.

This chapter is specifically written for the use of state forces conducting inspections on both state and locally owned structures. For inspection work performed by state forces on locally-owned structures, it is important for the Local Agency to be aware of the procedures that will be used by the state inspectors. Local Agencies are encouraged to also follow these guidelines but are able to tailor internal procedures to their specific organizational need.

6-2 Critical Damage Bridge Repair Report (CDBRR)

The NBIS (23 CFR 650.313(h))/MBE (Chapter 4) make reference to critical findings/deficiencies as a special category of repair need requiring immediate attention of the bridge owner with timely notification to FHWA and subsequent tracking of repair status.

In Washington State, a critical finding is principally defined as a condition that necessitates closing, posting, or restriction of a bridge or a portion of a bridge due to an identified structural deficiency requiring structural repair(s) before it can be reopened to unrestricted traffic in the original configuration. The restrictions are usually, but not necessarily limited to restrictions to vehicular traffic.

A second application of the term critical finding is for cases where conditions dictate an immediate agency response to develop and implement repairs, but where restriction of the bridge to traffic is not judged necessary. A common example is significant scour damage with no risk of immediate collapse but at increased risk in future flood events. Other scenarios are possible. WSDOT will use the NBI Deck, Superstructure, Substructure, Culvert, and Scour codes as a guideline. When any of these codes are set to 2 or less, this will generate a critical finding (CDBRR).

Initial notification (and subsequent status updating) for a critical finding is accomplished by completing and submitting the Critical Damage Bridge Repair Report (CDBRR). The CDBRR form was developed by the state to assist in documenting and tracking critical structural and safety related deficiencies on damaged structures.

FHWA will periodically review the reports and the tracking system to verify the needed repairs were promptly reported and the recommended repairs were completed within a reasonable period of time. FHWA may also conduct field checks to verify that critical repair work was accomplished.

CDBRR incidents can be caused by many factors. Recent examples include scour, fire, structural deterioration, and vehicular impact. There can be other causes (e.g. earthquake or other extreme environmental event). A relatively frequent cause is vehicular impact. A point to be aware of is that a short term closure or restriction of a facility to clean up debris and perform initial inspections does not qualify as a CDBRR incident by itself.

See Exhibit 6-1 for guidance on determining when a CDBRR is required.

The Bridge Preservation Engineer (for State bridges) or the WSDOT Local Programs Bridge Engineer (for Local Agency bridges) is to be notified by phone or email within one working day of identifying structural deficiencies to a structure that will likely require a CDBRR.

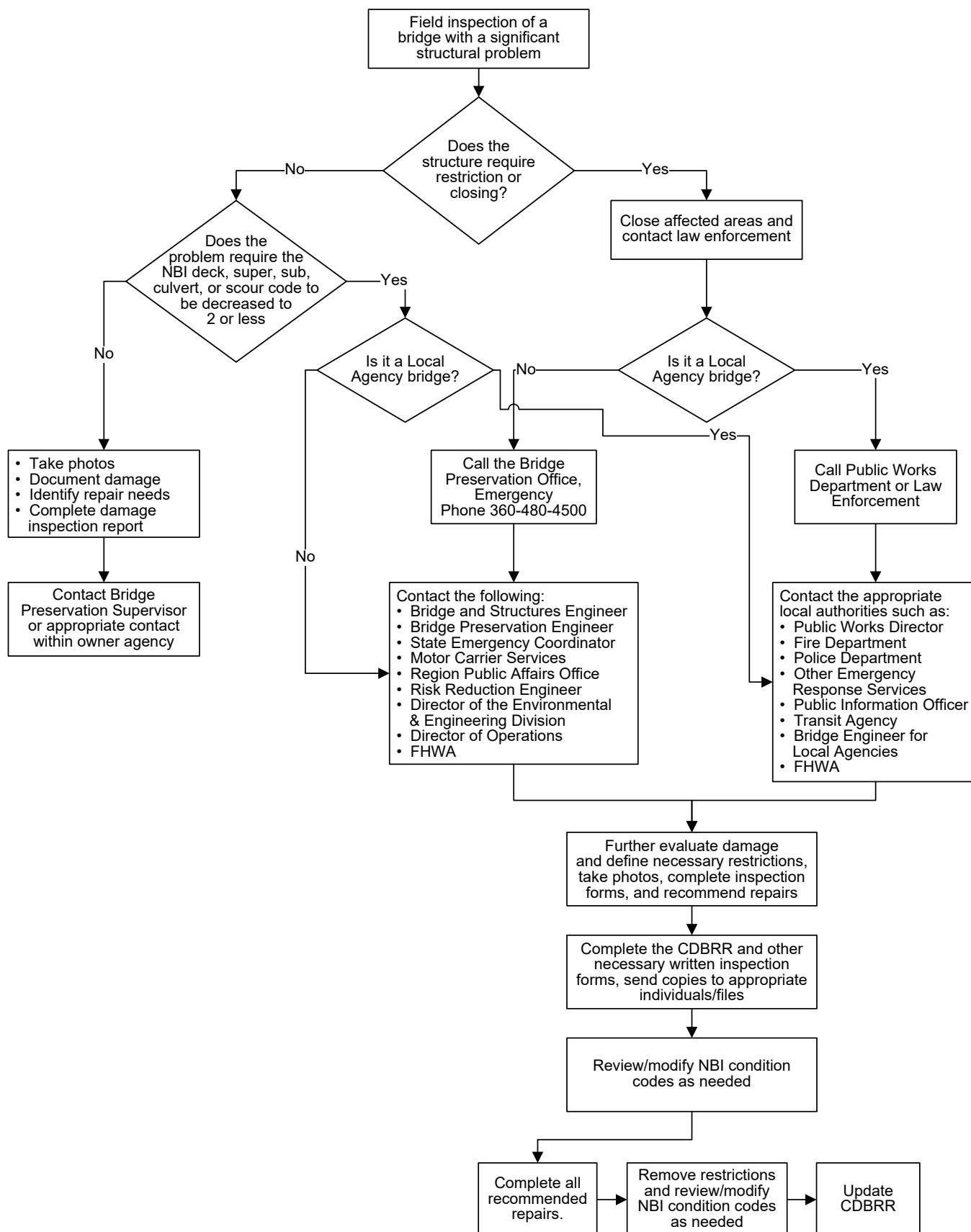
The CDBRR must be filled in as completely as possible immediately after the post-incident inspection. See Section 6-2.2 for CDBRR submittal requirements.

CDBRR incidents are to be registered in the database by completing a Damage Inspection Report (DIR) within BridgeWorks (BW). The DIR is discussed further in Chapter 3. The CDBRR and all supporting materials (photos, sketches, etc.) are completed and attached to the Files Tab in BW. All repair recommendations arising from the CDBRR incident are to be identified in the CDBRR and also entered as specific repairs in BW. The specific repairs in BW needed to allow the lifting of a CDBRR restriction shall be assigned a priority of "C".

Any time the recommended repairs cannot be accomplished immediately, the applicable NBI and BMS condition codes should be updated to ensure that the data accurately reflects the bridge's current condition and status.

The following procedure describes how to fill out the CDBRR.

Exhibit 6-1 Field Inspection Procedure



6-2.1 Completing the CDBRR

A dynamic CDBRR form (developed using InfoPath) may be copied from:

W:\Data\Bridge\BridgeDamage\CDBRR Form (For Inspectors Use). See Section 6-6 for a copy of the CDBRR form.

When filling out the CDBRR form, team leaders shall check the appropriate boxes in the upper right corner of the form. Check the CDBRR box when initially creating the form. The Update box should be checked and remain checked for all subsequent changes to the originally submitted CDBRR.

After the CDBRR type has been selected, the team leader may now fill in the applicable fields of the form. The form is organized into three distinct sections:

1. the bridge and inspection team information,
2. the description of the incident that caused the damage,
3. the follow-up or post repair activities on the structure.

Team leaders should fill out the form as thoroughly as possible although some information may be unknown and left blank.

1. **Bridge and Inspection Team Information** – This portion of the CDBRR briefly describes the basic information of the structure that has been damaged along with the inspection team information. The items within this section of the CDBRR are described below.
 - **Agency Name** – The name of the owner agency of the damaged structure.
 - **Structure ID** – The unique federal structure identification number associated with the particular structure in the NBI assigned by WSDOT.
 - **Bridge Number** – The bridge number given by the owner agency that is associated with the particular structure.
 - **Milepost** – The structure's milepost location on the inventory route.
 - **Incident Date** – The date of the incident that caused damage to the structure, if the information is available.
 - **Bridge Name** – The name given by the owner agency that is associated with the particular structure.
 - **CDBRR Date** – The date the CDBRR is filled out by the inspector.
 - **Operational Status Check Boxes** – Check the appropriate box(es) to describe the type(s) of restriction imposed immediately after initial incident clean-up and inspection:
 - **Bridge Closure** – A complete closure to traffic as a result of structural damage to critical components.
 - **Lane Closure** – The inspection results in the closure of one or more lanes due to structural problems.
 - **Temporary Load Posting** – The inspection results in the temporary load posting of the bridge until repairs can be accomplished.

- **Other Restriction** – If limits are placed on a bridge for some other reason than the three listed above, the Other Restriction option may be selected. (Example: sidewalk closure due to structural defect.) This item may be used to further explain any closures, postings, restrictions or other actions taken with the damaged structure. This explanation shall be documented within the Mitigation Measures Taken section of the CDBRR as described below.
 - **CDBRR** – Events identified due to low NBI codes but not involving operational restrictions should be documented in the Incident Information section.
 - **Lead Inspector's Name/CDBRR Author** – The team leader that performed the inspection or the person completing the CDBRR. (These are usually one and the same. On infrequent occasions, the CDBRR may be completed without there having been an inspection by BPO.)
 - **Lead Inspector Cert#** – The team leader's certification number. (Leave blank if there was no inspection by BPO.)
 - **Co-Inspector's Name** – The assistant inspector to the team leader. (Leave blank if there was no inspection by BPO.)
 - **Inspection Date** – The date when the inspection of structural deficiencies took place. (Leave blank if there was no inspection by BPO.)
 - **Incident Reported to the owner agency by** – The individual that reported the damage to the owner agency. (Leave blank when not applicable.)
 - **Date Reported** – actual date when the incident was reported to the owner agency. (Leave blank when not applicable.)
 - **Phone Number** – Contact number for the individual that reported the incident. (Leave blank when not applicable or unknown.)
2. **Incident Information** – This portion of the CDBRR describes the incident information along with the deficiencies found on the structure. The items within this section of the CDBRR are described below.
- **Description of Incident** – Description of the incident that caused damage to the structure, if the information is available.
 - **Description of the Facilities Damaged** – Detailed description and locations of damage to the structure. For example, on over height collisions, the team leader should measure and identify the extent and degree of the damage as well as the vertical clearance at the point of impact.
 - **Mitigation Measures Taken** – Description of any actions taken to safeguard the traveling public until recommended repairs can be made.
 - **Description of Recommended Repair(s)** – Description of repairs required to correct the deficiencies noted. This may be added while on-site or sometime after the field visit prior to submitting. In some cases, specific repair recommendations will not be known at the time of initial CDBRR submittal. A statement indicating that repair recommendations are under development should be included in such a case.

3. **Intermediate CDBRR Updates** – This section is filled out whenever an intermediate update to the CDBRR is made. See Section 6-2.2 for CDBRR submittal requirements.

Multiple Intermediate Updates are possible.

The items within this section of the CDBRR are described below:

- **Description of Update** – Description of the information to be updated. Insert initials/date in front of the description. This information is to remain in the report as subsequent intermediate updates are made. Insert initials/date in front of each individual description.
 - **Submitted By** – The individual who most recently updated the CDBRR.
 - **Date Submitted** – The date when the CDBRR is updated.
4. **Post Repair Update** – This section is filled out only when all repairs necessary to reopen the structure to unrestricted traffic and/or revise the associated low NBI condition codes have been completed. This section is generally to be completed within one month after completion of the recommended repairs has been verified. This section is typically filled out by the Repair Specialist. See Section 6-2.2 for CDBRR submittal requirements.

The items within this section of the CDBRR are described below:

- **Description of Work Done** – Description of repair work performed to correct the deficiencies to the structure. The appropriate verification photos may be attached as needed.
- **Date of Repair Completion** – Date when the actual repairs were completed and restrictions removed. If the completion date is not known, use the date verified by BPO.
- **Submitted By** – The individual who updated the CDBRR.
- **Date Submitted** – The date when the CDBRR is updated.

6-2.2 CDBRR Reporting

1. **CDBRR Submittals** – After the Damage Inspection is performed, the typical CDBRR will only contain information within the Bridge/Inspection Team section and within the Incident Information sections. Once completed, the team leader must place a PDF copy of the CDBRR in the "Files" tab of BridgeWorks for the respective structure, and send a copy of the report to the Bridge Preservation Engineer (for State bridges) or the WSDOT Local Programs Bridge Engineer (for local agency bridges). The information shall also be entered in the follow-up tracking system (by the Bridge Preservation Supervisor or his delegate), all within three (3) business days after determination that the event qualifies as a CDBRR event. For NBI reportable structures, the Bridge Preservation Engineer or the WSDOT Local Programs Bridge Engineer will then forward a copy of this report to the FHWA Division Bridge Engineer as soon as possible but no later than five business days after determination that the event qualifies as a CDBRR event.

Team leaders for the State are required to save the current XML file and a PDF copy of the CDBRR and all other electronic files, including emails and photos, associated with the Damage inspection into the Bridge Damage folder on the network. Damage inspections requiring a CDBRR and subsequent UPDATES are saved into W:\Data\Bridge Damage\CDBRR Events\ (Inspection Year) directory.

State team leaders are also required to send an email to the Bridge Preservation Engineer and the Bridge Preservation Supervisor, with a cc to the Load Rating Engineer, informing them that the CDBRR form is complete and saved within Bridge Damage Folder as described above.

2. **Post Repair Reporting** – The purpose of the CDBRR is to provide accurate and timely information to other interested parties, as well as to provide accountability, hence the requirement for submission of the Post Repair Update as soon as possible after satisfactory verification of the completion of the work and the removal of traffic restrictions.

The individual who completes the final UPDATE on a CDBRR may have to rely on reports and photos from those who have actually done the repair work. This is understandable and justified, recognizing that those who actually perform the work may not be the same person responsible for the bridge inspection and reporting. It is permissible in certain circumstances to verify the work and complete the Post Repair Update from the office based upon reports received from others. Consult with your supervisor, the Bridge Preservation Supervisor, or the Bridge Preservation Engineer to make the decision and to determine how the information is to be entered into the database (usually by Informational Report).

However, it remains a good and expected practice to have trained team leaders field verify that all the repairs are complete and satisfactory. If changes in condition coding are not anticipated, the follow-up verification inspection (one-time interim) is to be conducted within six months of completion of the required work. But in cases where NBI/BMS condition codes were reduced due to the incident and may be considered for increase after completion of the repair work, the follow-up verification inspection should be conducted as soon as possible following completion of the repair work.

After the repair verification is complete (from the office or by field inspection), a copy of the Post Repair Update shall be placed in the bridge file, a copy is also sent to the Bridge Preservation Engineer (for State bridges), or the WSDOT Local Programs Bridge Engineer (for Local Agency bridges), and the follow-up tracking system shall be updated (by the Bridge Preservation Supervisor or his delegate). For NBI reportable bridges, the Bridge Preservation Engineer or the WSDOT Local Programs Bridge Engineer will then forward a copy of this report to the FHWA Division Bridge Engineer. Update and resubmit the NBI and BMS data as necessary and described in Chapter 3.

It is not uncommon that the repairs generated by a CDBRR event are outside of the control of the inspecting unit and can take an extended time to complete. This is especially true when bridge replacement or substantial rehabilitation becomes necessary. In cases where final repair/replacement is expected to occur at some unidentified future time, then a CDBRR update may be prepared describing the status of the bridge at the time of the update and describing future repair/replacement plans to the extent they are known.

6-3 Other Damage Reports

Most damage inspections do not end up requiring a CDBRR. The most common case is related to vehicular impact damage, but other situations (e.g. scour, fire, sudden joint failure) are possible.

For those damage inspections that do not require a CDBRR, complete the Damage Inspection Report (DIR) as outlined in Chapter 3. For some cases of minor damage that are not likely to require a structural repair and where the region has not specifically requested our assistance a field inspection may not be required by BPO. Consult with your supervisor, the Bridge Preservation Supervisor, or the Bridge Preservation Engineer for further guidance. For such cases, the DIR may be completed using information provided by the region or other sources. On occasion, a DIR may not be needed at all for vehicular impact incidents requiring nothing more than minor cosmetic repair provided there are not legal or cost recovery circumstances involved. Consult BPO management to make the determination.

For all cases involving vehicular impact and requiring a DIR, the lead inspector assigned to respond to the incident shall provide within 3 working days of initial notification the following information in an e-mail addressed to the Bridge Preservation Supervisor and to the Repair Specialist:

- Structure ID; Bridge Number; Bridge Name; Bridge Location (MP)
- Date of Incident (if known; note if unknown)
- Description of Incident
- Identity and contact info of the person or office who reported the incident to BPO (note if unknown)
- Date the incident was initially reported to BPO
- Date of BPO Inspection; names of Lead Inspector and Co-inspector (actual date, expected date, or a note if no field inspection is expected)
- Brief description of damage to the structure
- Brief description of anticipated repair recommendations
- Status of inspection/report (for those cases where an inspection is expected)

All inspection related damage photos and sketches shall be uploaded to the Damage Directory on the network (W:\Data\Bridge\BridgeDamage\Year xxxx\[bridge no.] [structure type] [incident date]).

Permission levels for this network location are set such that information can be uploaded to and/or copied from this directory, but edits and deletions can only be made by select individuals (Bridge Preservation Supervisor, Repair Specialist, QA Engineer). Notify one of these individuals if corrections/deletions are needed.

6-4 Bridge Repairs

6-4.1 New Repair Entries

When a bridge inspection identifies a routine structural or non-structural deficiency, i.e., any deficiency that is not identified in Section 6-2, a repair note describing the deficiency and recommended repair should be written in the Bridge Inspection Report (BIR).

1. **BIR Repair Note** – The State utilizes the following guidelines when describing and documenting deficiencies needing repair.
 - Deficiencies that require repairs shall be documented in the body of the BIR with the associated BMS elements.
 - The description of the deficiency should be concise and detailed, including location and size of the defect.
 - Photos of deficiencies requiring repairs shall be taken for proposed and completed repair of any priority. Multiple photographs of a defect, including an overall view along with close-ups, are recommended.
 - A “REPAIR” notation should be put in the individual element note with the appropriate repair number. The repair number is generated by BridgeWorks and is referenced in the “Repairs” tab of the program.

Example: Stringer F in Panel 2 at Floor Beam 2 has a 4-½” long crack at the top cope. See photo #7. REPAIR #12345.

2. **Repair Entry** – Repair entries for deficiencies found during the course of a bridge inspection shall be entered within the “Repairs” tab found in the BridgeWorks program.

The repair entry should include:

- Priority for the repair
- Repair responsibility for the repair
- Date when the repair was first noted
- Accurate description of the repair required
- Proper identification of specific repair location(s). (In addition to notes in the description, consider adding a map and/or spreadsheet to the Files tab for any case that might be at all confusing to those who may not be intimately familiar with our terminology and layout on a bridge.)
- Photograph(s) of the damaged area
- Associate the repair entry to the appropriate BMS element(s) or condition note(s).
- Notice of any difference in the bridge orientation (pier numbering) from that in the plan drawings accessible on BEIS

It is recommended that repair entries with multiple items similar in nature are contained within the same repair. Do not put multiple repair items in the same repair note, unless they are similar.

Similar – Replace 10 ft. red tagged (RT) timber cap at Pier 2 and 5 ft. RT timber cap at Pier 3.

Not Similar – Replace upper 10 ft. RT timber Pile 5A and entire RT timber cap at Pier 6.

Due to the number of repairs generated for similar components, the State utilizes standard descriptions for similar types of repairs called the “Repair Protocols” which are located at W:\Data\Bridge\BridgeRepair\Repair Protocols. Contact BPO for examples and additional guidance for the protocols. For any repairs that are likely to require additional repair instructions from the BPO office, advise the Bridge Preservation Supervisor and the Repair Specialist of that need.

3. **Repair Responsibility** – Repair responsibilities utilized within the BridgeWorks program organizes repairs into separate repair types. The state utilizes these repair types to assign responsibility to the various entities that will, in most cases, ultimately perform the repair.

It is not the intent of this manual to direct region maintenance staff in their assignment of work. The following merely reflects our understanding of the most likely assignment.

The following repair responsibility codes are utilized by team leaders for the state.

- **B – Bridge Repair**

These repair responsibilities are generally associated with the bridge structure or conditions that impact elements of the bridge structure to include structural deficiencies, non-scour related erosion or conditions preventing proper inspection. Regional bridge crews are typically charged with completing these types of repairs for state structures.

Note: Regional Inspection staff are not expected to conduct in-depth inspection on bridge mounted signs and sign supports, but are expected to stay alert to obvious defects that can be safely observed and that may need further inspection and/or repair. Such defects on bridge mounted signs are to be communicated to the BPO sign bridge team at the first opportunity. They will typically provide repair recommendations via the Sign Bridge Repair List. But for a severe defect, direct communication to the regional bridge crew can and should be made if the BPO sign bridge crew is not available for quick response. Keep a record of any such communication and provide it to the BPO sign bridge team.

- **V – Vertical Clearance Repair**

This indicates that the bridge has restrictive overhead clearance for vehicular traffic and that no signing or improper signing is in place. Vertical clearance signs are required for measured clearances less than or equal to 15’-3” and the policy for the State is to post at a height 3” less than measured. Measured clearances less than 14’-3” require advanced restrictive height warning signs as defined in the updated MUTCD. State team leaders shall follow the guidelines in Section 3-4.1.J for further instructions on vertical clearance repairs. The Bridge Preservation Office (BPO) Geometry Engineer is tasked with keeping track of vertical clearance issues and repairs for State structures. Regional Sign crews are typically charged with completing these types of repairs for state structures.

- **S – Scour Repair**

This indicates that the bridge site needs to be evaluated for scour mitigation. A description of the condition of concern must be provided in the inspection notes. Repair actions to correct the condition should be included in the repair description. The BPO Scour Engineer or the Local Agency’s hydraulic engineer will review and may revise the recommended repair, the repair priority, or may deactivate the repair altogether after careful review of the bridge site. A note by the hydraulic specialist should be added to the inspection report detailing their findings, typically within

the note of WSBIS Item 1680. Regional bridge crews are typically charged with completing these types of repairs for state structures.

Engineering scour mitigation requires the engineer to work closely with environmental agencies to develop the best corrective action plan for all. Erosion caused by runoff from the bridge is not considered a scour repair.

Team leaders for the state shall apply the following guidelines when selecting a Scour repair responsibility.

- For new scour repairs or monitoring, enter an (S) scour repair (responsibility) and assign it a Priority 0, see Section 6.4.1.4. Notify the Bridge Scour Engineer, including photos, sketches and any other information. Code BMS Element #361 in the BIR and provide notes with the date that the scour engineer was contacted. The scour engineer will review the conditions and set the priority.
 - For an existing scour related repair (responsibility S) with a previously set priority, leave the existing priority as it is set. If the inspector feels the field conditions justify a change in the current priority, notify the BPO Scour Engineer for review prior to releasing the report.
 - When an existing scour related repair responsibility is not S, ensure that the repair (responsibility) is changed from a (B or current) to an (S). Notify the BPO Scour Engineer, including photos, sketches and any other information. Code BMS Element #361 and describe the change noting the date that the scour engineer was contacted.
- **R – Railroad Repair**

WSDOT conducts limited scope (non-structural and non-mandated) “Primary Safety” inspections of railroad owned bridges that cross over state-owned highways. The R repair indicates that a railroad owned bridge crossing over a public highway has a condition that could pose a hazard to the motoring public, such as ballast falling onto the roadway. The repair description should include some indication of the relative urgency of the recommended repair. The inspecting highway agency (WSDOT or local agency) must ensure that all such repair recommendations are communicated to the appropriate department/individual at the correct railroad. For higher priority conditions, consider reducing the inspection frequency.

Note: Vertical clearance signage needs on a railroad overcrossing will likely become the responsibility of the region. Assign such repairs the responsibility code V as outlined above.

- **U – Utility Repair**

This indicates that there is a deficiency with a utility (not owned by the bridge owner) mounted to the bridge. The inspecting highway agency (WSDOT or local agency) should ensure that all such repair recommendations are communicated to the appropriate department/individual at the correct utility. If the deficiency poses a safety risk to the traveling public or to bridge inspection and maintenance crews, or if the deficiency is creating a problem for the structural integrity of the bridge, then the repair recommendations must be communicated to the appropriate department/individual at the correct utility. The Risk Reduction Engineer may be able to facilitate the communication in urgent situations.

- **J – Roadway Repair**

This indicates that there is a non-bridge related deficiency in the roadway approach to a bridge. Regional roadway maintenance crews are typically charged with completing these types of repairs for State structures. For WSBIS, deck joints and defects on both sides of the abutment headers are classified as B repairs and not J repairs.

4. **Repair Priority** – The priority of the required repair establishes the urgency at which the repair shall take place. The priority may evolve into a more urgent priority if repairs are not completed.

- **Emergency** – Repair work requiring immediate action when structures are partially or completely closed.
- **Urgent** – Repair work requiring prompt action and must be completed when structural details and bridge crews become available.

Emergency or Urgent repair needs must be communicated directly to the region maintenance staff (or bridge owner) via phone call and follow-up email. Copy the Bridge Preservation Supervisor and the Repair Specialist on any such communication.

There is no specific “Emergency” or “Urgent” priority designation in the inspection application and these repairs may not always end up being published in the Bridge Repair List on BEIS. (A not uncommon example of an emergency repair is a deck hole-through where the hole is reported to the region maintenance crew by others and they respond and fix it immediately. In such a case, the bridge office may not send a crew or prepare an inspection report until well after the defect has been repaired.) But whenever an emergency or urgent repair need is entered into the application, the repair entry must be assigned an appropriate priority from the following listings (usually Priority 1 but sometimes Priority C when a CDBRR event is involved.)

- **Priority C** – Priority C is to be assigned to any CDBRR related repair entry that must be completed before the bridge may be returned to the level of unrestricted service that existed before the event and/or the associated low NBI codes can be increased. Priority C is to only be used in conjunction with a CDBRR event. Do not use Priority C for repairs that do not directly lead to a lifting of the restrictions imposed as a result of the CDBRR event. Completion of a Priority C repair (by maintenance or by contract) will require follow-up by inspectors to verify the repair entry(ies), review condition coding, update the CDBRR, and disseminate the information to the appropriate individuals. Completion of a Priority C repair must be communicated directly to the Bridge Preservation Supervisor and the Repair Specialist. See Section 6-2.2 for CDBRR reporting requirements.
- **Priority 1** – A Priority 1 repair describes a deficiency to a primary bridge element that could cause a major impact to the bridge such as load restrictions. This type of deficiency may lead to more extensive and costly structural repairs if not completed in a timely manner.

Priority 1 is the highest priority assigned to a repair which if left uncompleted, could turn into an urgent or emergency repair during subsequent inspections.

Priorities 1 and C are the highest priorities that can be assigned within the inspection application.

These repairs are top priority to ensure:

- Public Safety
- Reliability of the Transportation System
- Protection of Public Investments
- Maintenance of Legal Federal Mandates

On occasion, the inspection frequency may need adjustment to ensure that conditions since the previous inspection have not deteriorated to urgent or emergency status, that safety of the traveling public has not become compromised, and that inspectors may verify that repairs have been done in a timely manner. Additionally, the Rating Revision flag (WSBIS Item 2688) may require a "Y" to reexamine the bridge for load carrying capability.

Examples of deficiencies requiring Priority 1 repairs are as follows:

- Repairing exposure of damaged strands and/or rebar.
 - Removing or mitigating any existing potential for material falling from the bridge.
 - Repairing significant joint defects that impact the bridge or create traffic hazards such as 'D' spalls in the header with exposed steel.
 - Trimming or removal of trees, brush or debris that interferes with inspection procedures or equipment access. List the month and year of the next inspection by which this repair needs to be completed.
- **Priority 2** – A Priority 2 repair describes a minor to moderate deficiency to a primary bridge element or a major deficiency to a secondary bridge element. This type of deficiency would not cause major impact to the level of service of the bridge or compromise safety. But, this type of deficiency may lead to more extensive and costly structural repairs if not completed in a reasonable timeframe.

Priority 2 is different from Priority 1 in that a Priority 2 deficiency does not immediately jeopardize:

- Public Safety
- Reliable Transportation System
- Protection of Public Investments
- Maintenance of Legal Federal Mandates

A Priority 2 repair would not generally be cause for a reduction in inspection frequency or a reexamination of a bridge's load rating.

Examples of deficiencies requiring Priority 2 repairs are as follows:

- Repair Yellow-tagged (YT) timber members.
- Repair spalling in secondary members.
- Repair spalling in the deck soffit and/or concrete girders. If not excessive, this could be a Priority 3.

- **Priority 3** – A Priority 3 repair is generally a minor nonstructural or “Housekeeping” type of repair that could evolve into a higher priority if not corrected.

Examples of deficiencies requiring Priority 3 repairs are as follows:

- Cleaning of drains, bridge members or deck and sidewalk surfaces.
 - Remove debris from off of pier caps and abutments.
 - Remove garbage, debris or vegetation from around abutments, piles, or retaining walls.
 - (Note that all such repairs shall be elevated to priority 1 if the material of concern is significantly impeding operation of bridge structural components or is making complete structural inspection of the bridge impossible.)
- **Priority M** – Monitor repairs require no action from the region bridge crews, but they should be aware of the condition, since the problem/defect could evolve into a repair. A reduced inspection frequency may be necessary in order to monitor the problem/defect. The state utilizes the following guidelines when implementing and administering monitor repairs.
 - Every monitor repair note must be updated at each routine or interim inspection with a clear statement of findings. This update including the inspection date, inspector initials, and notes on the changed condition will be appended to the existing repair note. If the condition is unchanged state, “No changes noted” and include the year and initials. This specific instruction applies to monitor repairs only (The “no changes” note is generally not expected for priority C, 1, 2, or 3 repairs).
 - Every monitor repair note must include measurable information about the condition of interest, allowing subsequent inspectors to more easily and accurately determine if the condition is changing. Photos, sketches, and/or measurements are among the ways to provide this information, which must also clearly include location and date. It may be appropriate to reference an attached file with historical data in the monitor repair note.
 - Over time, every monitor repair note will provide information on what circumstances warrant repair action and/or monitor entry deactivation. Inspectors will be expected to provide this information when possible, but it is recognized that this information may require more detailed evaluation and structural analysis beyond the scope of bridge inspection work.

Some existing monitor repairs may not meet the requirements listed above. In this case, please coordinate with the Bridge Preservation Supervisor to determine if a monitor repair is appropriate.

- **Priority 0** – A Priority 0 repair is typically used only for J repairs and other repairs not directly attached to, or affecting the bridge. This priority is also used for new scour repairs, as a flag to the WSDOT Scour Engineer, to indicate the need for review and actual assignment of the proper priority.

However, for J and U repairs, inspectors must use judgment in determining the impact of the situation. If an existing condition directly impacts the structure, presents a safety hazard, or interferes and prevents the bridge from being properly inspected a Priority 1 should be assigned. Conditions creating a hazard to pedestrians or traffic need to be reported to the region by the inspector as soon as possible and a note of the communication identifying the date, time and point of contact should appear in the repair note.

6-4.2 **Modifying Existing Repairs**

When there is need to change or update the verbiage within a repair entry after subsequent inspections, team leaders for the State shall apply the following guidelines when modifying the repair.

- The team leader shall add his/her initials along with a date in parenthesis with a brief description of any changes to an existing repair note, including a priority change.
- Minor edits to repair text (spelling, caps, minor grammatical changes) should generally be avoided unless something else is being done to the entry.
- Edits to repair priority entries other than priority M need be made only when the conditions/needs change sufficiently to warrant an update.
- If a significant change to a repair is needed, eliminate the original repair entry by entering a date in the "Verified" column. Add a note in parenthesis in the repair description stating reasons for its removal, and then enter a new repair with the original repair date in the "Noted" field. (The application typically enters today's date in the Noted field when a new repair is created. The Noted date can be changed by the inspector and must be changed in all cases where the contents of a previous repair entry are entered into a new repair entry.)
- Break out and rewrite repairs when dissimilar elements are called out in the same repair as described in Section 6.4.1.2. Date the new repair with the original repair date for the respective elements.

6-4.3 **Repair Verification**

At each routine inspection, the current status of all open (not previously verified) repair entries must be reviewed by the inspection team and field reviewed provided the necessary access equipment is available. If the recommended work has been completed, the repair entry in the BIR shall be verified in accordance with the following guidelines.

- BMS element condition states and notes where the repairs are referenced must be updated to accurately describe the repaired condition after the inspection.
- Any portion of a primary BMS element that has been repaired is typically coded in Condition State 2. Primary members that have been completely replaced should be returned to Condition State 1.
- A completed repair should have before and after photos with the verification date and the repair number referenced in the individual BMS element note. Remove this verification note during the subsequent inspection.

Example: Stringer F in Panel 2 at Floor Beam 2 crack has been stop drilled. REPAIR #12345 verified on 1/20/02. See photos #7 and #9.

- In the "Repairs" tab of BridgeWorks, the team leader should enter the verification date within the "Verified" column and attach the after photos to the "Photo" column.
- Explain in the repair description why verification could not be accomplished and what it will take to do so for the next inspection (equipment, environment, etc.).

Repairs to state structures are most often performed by region bridge maintenance crews. Their work is often reported to BPO via a Maintenance Bridge Repair Report (MBRR) (see also Section 6-5). When this is done, the BridgeWorks application uses the info entered in the MBRR to enter a Maintenance Date (Maint).

The Maint date informs the bridge inspection team that the work specified by the repair entry has been completed. Once the date is entered, the responsible maintenance crew does not see this entry on the Bridge Repair List and typically does not revisit this repair entry. The bridge inspection crew's responsibility at this point is to verify that the reported maintenance satisfactorily completes the recommended repair(s). When a Maintenance date has been entered, consideration should be given to the need to schedule appropriate access equipment prior to heading out to the field. Discuss with your supervisor as needed.

There are, on occasion, repair entries within BridgeWorks that contain inappropriate or unexplained maintenance completion dates. Scenarios include, but are not limited to:

1. The work performed does not complete the full scope of the original repair recommendation;
2. The work performed is not satisfactory;
3. Further deterioration has occurred rendering the work performed inadequate;
4. There is no visual evidence of any work done; (e) the work performed belongs in fact to a different repair entry (i.e., the MBRR was improperly entered).

In cases such as these, correction is needed to ensure that the repair needs continue to be properly communicated back to the region bridge maintenance crews.

The team leader shall apply case-by-case judgment in making these corrections. Two primary options should be considered:

- **Option A** – Add a verified date with photos and/or notes in the repair description (does not have to be both provided there is no question of the intent). Write a new repair entry with appropriate supporting information and noting the changes being made. (**Example:** A repair entry of large scope has been partially completed. The existing entry could be verified, the description modified to note the portion that was completed, and the new entry would be referenced. The new repair entry would reference the old entry, note the partial completion and would describe the remaining scope. In most cases, the noted date of the new entry should be the same as the original entry.)
- **Option B** – Enter an Override Date in the BridgeWorks application. Modify the repair description to explain the reason for the override and provide the date and initials of the author. (This option may be most appropriate for a case where the Bridge Repair report was incorrectly entered. It could also be appropriate for the case where only a small part of the overall scope of a repair was addressed by the work in the Bridge Repair Report.)

In some extreme and/or complex cases, direct communication with the region bridge maintenance crew to explain the situation may also be advisable.

6-5 Maintenance – Bridge Repair Report (MBRR)


The repair descriptions from the inspection reports for WSDOT-owned bridges are entered into the “Bridge Repair List” (BRL - a state document), which can be viewed on the internal homepage (BEIS) of the WSDOT website. The BRL is updated twice a year. Maintenance crews for the State will review the list and schedule the work to complete selected bridge repairs. When a repair is completed, the maintenance crew may submit a Maintenance – Bridge Repair Report (MBRR) documenting the completed repair. The MBRR is typically submitted electronically via a link provided on the Bridge Repair List website. If submitted electronically, the program inserts a “maintenance date” for that repair into the database. Entering the maintenance date will automatically remove the repair from the next edition of the printed active “Bridge Repair List”. However, the unverified repair along with the maintenance date will still appear in the next Bridge Inspection Report (BIR). The MBRR is a state document, but it is available to Local Agencies for utilization if they do not have a bridge repair documentation process in place.

An example of a completed Maintenance - Bridge Repair Report can be found at the end of this chapter.

6-6 Appendices

Appendix 6-A	Critical Damage Bridge Repair Report
Appendix 6-B	Critical Damage Bridge Repair Report - Instructions
Appendix 6-C	Maintenance - Bridge Repair Report Example


Appendix 6-A Critical Damage Bridge Repair Report

 Washington State Department of Transportation					<input type="checkbox"/> CDBRR <input type="checkbox"/> Update
<h2>Critical Damage Bridge Repair Report</h2>					
Agency Name	Structure ID	Bridge Number	MP	Incident Date	
Bridge Name			CDBRR Date:	Check all that apply (Top three require a CDBRR)	
Lead Inspector's Name/CDBRR Author			Lead Inspector's Cert#	Bridge Closure	<input type="checkbox"/>
				Lane Closure	<input type="checkbox"/>
Co-Inspector's Name			Inspection Date	Temporary Load Posting	<input type="checkbox"/>
				Other Restriction	<input type="checkbox"/>
Incident Reported to BPO by			Date Reported	Phone No:	
Incident					
Description of Incident					
Description of Damage to the Structure					
Mitigation Measures Taken (And explain in more detail any closures, postings, restrictions or other actions taken)					
Description of Recommended Repair(s) (This may be added while on-site or sometime after the field visit prior to submitting)					
Intermediate CDBRR Update:					
Description of Update:					
Update Submitted By:			Date Submitted:		
Post Repair Update : For use by the Repair Specialist					
This section to be completed within 1 month after verified completion of recommended repair.					
Description of Work Done					
Date of Repair Completion or BPO Verification Date If Completion Date Is Unknown	Update Submitted By (Print Name)			Date Submitted	

Appendix 6-B

Critical Damage Bridge Repair Report - Instructions

A CDBRR is required whenever one of the four conditions in the red box below have been executed.

 Washington State Department of Transportation					<input type="checkbox"/> CDBRR <input type="checkbox"/> Update
<h2>Critical Damage Bridge Repair Report</h2>					
Agency Name	Structure ID	Bridge Number	MP	Incident Date	
Bridge Name			CDBRR Date:	Check all that apply	
Lead Inspector's Name/CDBRR Author			Lead Inspector's Cert#	Bridge Closure	<input type="checkbox"/>
Co-Inspector's Name			Inspection Date	Lane Closure	<input type="checkbox"/>
Incident Reported to BPO by			Date Reported	Temporary Load Posting	<input type="checkbox"/>
				Other Restriction	<input type="checkbox"/>
Incident			Phone No:		
Description of Incident					
<p>These text fields expand as the line is filled. If more than 255 characters are in any of these lower boxes</p>					
Description of Damage to the Structure					
<p>the boxes will be outlined with red dashed lines. Ignore the validation error pop-up box when saving the file</p>					
Mitigation Measures Taken (And explain in more detail any closures, postings, restrictions or other actions taken)					
<p>Save the file following the prescribed naming convention.</p>					
Description of Recommended Repair(s) (This may be added while on-site or sometime after the field visit prior to submitting)					
<p>Create a PDF copy and store both that and the .xml copy in the Bridge Damage folder.</p>					
Intermediate CDBRR Update:					
Description of Update:					
<p>This text field expands as the line is filled.</p>					
Update Submitted By:			Date Submitted:		
Post Repair Update : For use by the Repair Specialist					
This section to be completed within 1 month after verified completion of recommended repair.					
Description of Work Done					
Date of Repair Completion or BPO Verification		Update Submitted By (Print Name)		Date Submitted	
Date If Completion Date Is Unknown					

Do not fill out this section outlined in red unless returning to the site to report on the repairs that have been completed - The Update Report type up above (top right corner) would be selected at this time.

The final procedure once the form is completely filled out is to create a pdf copy of it for placement into BridgeWorks. The XML file should not be placed in BridgeWorks. Place both copies (XML & pdf) in the Damage folder with any other documentation, photos etc. per WSBIM procedures in Ch. 6.

Appendix 6-C Maintenance - Bridge Repair Report Example

BEIS - Maintenance Report

Page 1 of 1

To: Bridge Preservation Office
PO Box 47341, Olympia, WA 98504-7341

Maintenance Date 2006-07-18

Structure Identifier 0005090A		10000
Bridge Number 5/321	Bridge Name CAPITOL LAKE	
Mile Post 104.52	Location 0.5 N JCT US 101	
Repairs Completed By B - Bridge Maintenance		
Origin of Repairs B - Bridge Repair List Repair No S10000 , Priority 1 , Dated 2003-12-03		
Repair Description Repair the strip seal at the north abutment. (verified - repair completed but has failed again; see new repairs 10002-4)		
Type of Materials Used - Suppliers Sand blast and sika-flex with backer rod		
Repair Remarks and Details Cleaned expansion joint by sand blasting and poured sika- flex joint.		
Weather Conditions		
Completed By Steve McIntyre	Posted Date 2006-07-18	Map Repair No

7-1 General

This chapter establishes policies on how the Washington State Department of Transportation (WSDOT) and local agencies within the state of Washington conduct quality control/quality assurance (QC/QA) on its respective bridge and tunnel inspection programs to meet FHWA requirements within 23 CFR 650.307(c), §650.313(g), §650.507(c) and §650.513(i).

The guidelines presented herein are those in use by both the WSDOT Bridge Preservation Office (BPO) and Local Programs (LP). Sections 7-2 through 7-8 pertain to the QC/QA program implemented by the BPO. Sections 7-9 through 7-11 pertain to the QC/QA program developed by the LP Office. Local Agencies are encouraged to follow these guidelines so as to provide a consistent basis for evaluation and reporting of inspection data.

The QC/QA programs documented in this chapter, including the appendices, have been approved for use by the Federal Highway Administration (FHWA.) As an alternative individual agencies may choose to establish their own QC/QA policies and procedures. The procedures will require documentation similar to what is discussed in this chapter and meet the approval of the SPM or named delegate as well as the FHWA Division Bridge Engineer within the state of Washington.

Any QC/QA program being developed will want to reflect on the five areas identified in §650.307 through §650.315 and §650.507 through §650.515. A thorough QC/QA program will examine these five areas as well as any internal policies and procedures established within a given agency as a means of determining whether or not the inspection program maintains what FHWA defines as a high degree of accuracy and consistency.

The five topics identified in 23 CFR 650 include:

- Bridge Inspection Organization (§650.307 and §650.507)
- Inspection Staff Qualifications and Re-Certification (§650.309 and §650.509)
- Inspection Frequency (§650.311 and §650.511)
- Inspection Procedures (§650.313 and §650.513)
- Inventory (§650.315 and §650.515)

There are also many sources of information available that can help an agency in developing their own QC/QA programs. One particularly helpful is a document written by Dr. Glen Washer and Dr. C. Alec Chang entitled *Guideline for Implementing Quality Control and Quality Assurance for Bridge Inspection*. AASHTO sponsored the creation of this document completed in June 2009 to help those agencies in need of assistance in developing their own QC/QA programs. Section 1-4 from that document identifies seven characteristics that are common to effective programs.

These include:

1. Independent Reviews.
2. Objective and quantitative measures of quality.
3. Quality program documentation.
4. Comprehensive coverage of the inspection and load rating program.
5. Established procedures for corrective actions.
6. Established schedule for evaluations.
7. Documented review procedures.

The section concludes by saying that these characteristics of effective programs can be used in many ways and methodologies depending upon an agencies specific programmatic characteristics and needs.

It is the intent throughout this chapter that the term “bridge” refers to all structures including bridges, culverts and tunnels. The QC/QA process for tunnel inspections performed in the state of Washington is currently under development and is anticipated to be incorporated into the 2018 update of the WSBIM.

7-2 WSDOT Bridge Preservation Office Quality Control Program

7-2.1 Purpose

To establish within management a diverse set of quality control (QC) procedures to be used in the BPO in order to maintain a high degree of accuracy and consistency within the BPO inspection program. These procedures have been developed uniquely for each of the different units in the office. The procedures focus on the following areas:

- Qualifications of designated positions within the office.
- Maintaining bridge information (electronic and physical information).
- Management/analysis of bridge load rating and bridge scour.
- Office review and Field verification of information and conditions collected in bridge inspection reports.

The QC program's role is to evaluate and communicate directly with staff, any assessments made of their work. BPO policy and practices should be evaluated throughout this process and be addressed and adjusted accordingly in order to create a more consistent and accurate inspection program.

7-2.2 Definitions

Both the *National Bridge Inspection Standards (NBIS) Regulation 23 CFR 650.305* and *National Tunnel Inspection Standards (NTIS) regulation 23 CFR 650.505* define *Quality Control* as those procedures intended to maintain the quality of a bridge/tunnel inspection and load rating at or above a specified level. QC is performed within a work group.

7-2.3 Time Frame of Evaluation

This is an ongoing process throughout the year by each of the individual units within the office.

7-2.4 Personnel

To meet the federal requirements identified in 23 CFR 650 for Bridges, Tunnels, Structures and Hydraulics, the BPO has six distinct units that work together. These units consist of the following:

- Coding and Appraisal Unit
- Regional Inspection Unit
- Risk Reduction Unit
- Special Structures Unit
- Underwater Inspection Unit
- Movable Bridge Unit (Ch. 8 is dedicated to this unit and the work performed)

The QC program will be administered by the supervisor in each of these respective units. There may be portions of the work that are delegated to staff positions. This work will be addressed further below in each of the individual units.

7-3 Coding and Appraisal Unit

The Coding and Appraisal Unit is led by the Coding and Appraisal Engineer and is responsible for administering QC procedures within the unit. Listed below are those areas identified in 23 CFR 650 that require defined QC procedures. These procedures may be delegated to others within the unit at the discretion of the Coding and Appraisal Engineer.

7-3.1 Bridge File Maintenance

There are two positions within the Coding and Appraisal Unit that work at maintaining both the physical and electronic bridge files. These are parallel positions (Resource Technician and Inventory Technician) that operate as QC for each other.

Physical Letter Files – The Resource Technician performs an annual audit by comparing a current list of bridges from the Washington State Bridge Inventory System (WSBIS) database against the physical letter files. All conflicts between the electronic list and the physical letter files are addressed, validating both the physical and electronic portions of the bridge files.

This audit has three QC functions:

- Identifies physical letter files that are missing so they can be recovered.
- Validates the accuracy of the electronic database with respect to the bridges listed in the inventory.
- Ensures that records for bridges that have been added, transferred, or removed from the inventory are complete and accurate.

Verify that all signed inspection reports from the previous year made it into the letter file.

There are two types of letter files depending on the type of inspection a bridge receives. Appendix 7-A provides information on what is contained in each of these two types. The physical letter files are located in the Bridge Resource Room (Room #2041). See the attached Bridge Office floor plan in Appendix 2-A for locations of the other various types of physical files kept in the office.

Electronic Files – The Resource Technician is also responsible for scanning electronic copies of signed inspection reports which are placed in the physical letter files, for placement in the electronic file for a particular bridge. The Inventory Technician is assigned the task of QC of this scanning process, reviewing 10 percent of the electronic files for accuracy and completeness.

Items reviewed include whether the final inspection report form was the “released” version of the report, all pages are included, all inspection types listed on the first page are included, and that the Team Leader signed the report. Once the spot check has been performed by the Inventory Technician on a batch of inspection reports, the Resource Technician uploads the reports on the BEIS server for access by all with the privileges to do so.

7-3.2 Processing Inspection Reports

Field Inspections – Bridge inspection reports are processed by the Bridge Data Steward after all the QC is complete between inspectors and supervisors. The Bridge Data Steward performs the following QC actions:

- Validates that the QC process between the inspectors and supervisors was performed (initials required on WSBIS sheet used to initiate inspection processing).
- Checks changes made to all codes in WSBIS report for reasonableness and consistency.
- Runs automated error checks within BridgeWorks application. See BPO coding guide for a detailed list of error checks.
- Checks to ensure that inspection report types are used correctly, and that when multiple report types are used in a single inspection that they all have the same inspection date.

When these checks are completed and errors corrected, the Bridge Data Steward “releases” the inspection data into the “State System Bridge Inventory” database.

The Bridge Data Steward then prints out a fresh copy of the bridge inspection report with released data, and sends that to the bridge inspectors for signature. The Bridge Data Steward then sends the WSBIS report with initials validating the inspector QC process to the Bridge Resource Technician, who also receives the signed inspection reports from the inspectors for scanning and filing. This WSBIS report is matched against the signed inspection reports to ensure they are returned to the Bridge Resource Technician for final processing as described above. The WSBIS report with QC initials is then filed for auditing purposes. These changes will then be permanently recorded in the database and immediately visible on the BEIS website.

Informational Inspections – The “State System Bridge Inventory” database often needs updated information from sources other than field bridge inspections. This includes updates to traffic or route information and setting flags for inspectors to take measurements or other specific field work that should be performed during the next field inspection. In all cases, a note is added to the informational inspection describing the changes made.

When single bridges or a small number of bridges need updating for new non-inspection data, the electronic data is reviewed and processed by the Bridge Data Steward prior to releasing into the database, though no printouts, signatures, scanning or filing is done. When batch updates are performed on a large number of structures, the Bridge Data Steward is involved in reviewing the changes, but the release process is done automatically by the BridgeWorks Application Engineer. Similarly, informational inspections are also created by the Bridge Preservation Supervisor as needed to make changes to bridge repairs. These changes are not reviewed by the Bridge Data Steward.

7-3.3 Coding New Bridges

The Bridge Inventory Technician has primary responsibility for tracking the construction of new bridges and entering them into the “State System Bridge Inventory” database. See the attached flowchart in Appendix 7-B that describes this process. This involves considerable coordination with many individuals both within BPO and other offices in WSDOT to obtain complete and accurate information. Due to this complexity, the flow chart is considered part of the QC process since it plays a key role in ensuring that all steps are taken.

QC of the inventory process consists of the following:

- All plan sheets are reviewed by the Bridge Resource Technician prior to loading onto BEIS to ensure that the sheet labels are correct and that the image is complete and legible.
- The new bridge inventory data is created as an Inventory report type, and is reviewed by the Bridge Data Steward prior to release into the “State System Bridge Inventory” database.

7-3.4 Data Concurrency

The Bridge Geometric Engineer is responsible to make sure that selected WSBIS fields have data that is reasonably concurrent with other WSDOT databases which serve as sources for these fields. Since this is a manual operation at this time, data queries are initiated with several other offices once per year in the late summer and the WSBIS is updated with the revised data in the following winter. The WSBIS fields managed this way are included in Appendix 7-C.

In order to obtain complete information on these selected fields from other databases in WSDOT, these external databases must have a complete and current list of bridges in the WSBIS and selected location information accurately coded. Regular communication and cross checking between the Bridge Geometric Engineer and the data stewards for these other external databases ensures this data integrity and concurrency, and has significant quality benefits for both the WSBIS and other databases with shared information.

7-3.5 Vertical Clearance and Clearance Posting

The Bridge Geometric Engineer manages the collection of vertical clearance data for all bridges intersecting state routes. In most cases, this consists of providing guidance to bridge inspectors on when and how to collect vertical clearance data, and reviewing and entering this data after it has been collected. This work serves as a QC mechanism for the vertical clearance data and for any bridge posting recommendations that result from vertical clearance findings.

7-3.6 Inspector Certification

Every Team Leader is responsible for keeping their own records. Their supervisors will validate certification training records during each annual performance evaluation and provide this information to BridgeWorks Application Engineer for implementation into the Bridgeworks software. Acceptable recertification courses or conferences as established by the Statewide Program Manager (SPM) can be found in Chapter 1. Inspectors who meet the qualifications retain active certification in the BridgeWorks software and retain accounts as needed to create bridge inspection reports.

7-3.7 **Inspection Status Report and Performance Indicators**

The BridgeWorks Application Engineer maintains a database and reporting tool called the Inspection Status Report (ISR) that serves as a “management dashboard” for the BPO. The ISR identifies bridges due for inspection and tracks their inspection progress. It also creates a record of NBI compliance for on-time inspection for federally reported inspection types. The ISR is considered a QC process for the entire bridge inspection operation.

7-4 **Risk Reduction Unit (Load Rating)**

The Load Rating group is led by the Risk Reduction Engineer who is responsible for administering QC within the group. QC consists of procedures defined below that will assess load rating work completed by consultants as well as what is completed in-house. Currently those load ratings completed by consultants and in-house consist of state owned bridges that meet the federal definition of a bridge. QC levels 1 and 2 listed below will be applied to all ratings submitted to the load rating section.

7-4.1 **QC Criteria**

All state owned bridges (owner code 1), that qualify as an NBI reportable bridge with new load ratings shall be reviewed per Level 1 as described below.

Level 1 –

- Verify that a stamped summary sheet is included in the rating file.
- Evaluate the rating factors, do they make sense? For example, is the OL1 RF greater than OL2 or the RF for AASHTO 1 greater than HS20.
- Verify that all elements/members that require ratings are rated.
- Verify that preliminary calculations are included in the submittal, especially for complex structures for accuracy. These files might include dead loads, factors, and any assumptions used in the calculations.
- Verify that the rating represent the condition of the structure based on the latest inspection report.
- Verify that each bridge’s physical characteristics are modeled properly.
- Verify reinforcing/pre-stressing; typically check points at maximum stress.
- Verify that dead and live loads are modeled properly.
- Verify that the inventory and operating tons are updated in BridgeWorks and the posting matches the rating where needed.

Level 2 – This will require an independent load rating of eight structures per calendar year for state bridges. Rating factors and condition of the superstructure or substructure will be the main factors in choosing the bridges. That is, bridges with low rating factors or have an NBI code less than 5 for superstructure or substructure will have higher priority for review as well as when rating factors do not appear to be correct based on either the design load or condition.

7-5 Risk Reduction Unit (Scour Group)

The Scour Group is also led by the Risk Reduction Engineer and is responsible for administering QC within the group. QC tasks may be delegated to the Scour Engineer at the discretion of the Risk Reduction Engineer. QC of scour items will consist of procedures defined below to assess the scour work completed by the Regional and Special Structures Inspection Units as well as that of the Scour Group. QC will also verify that new structures added to the inventory are properly designed for scour and are not scour critical.

Note: The criteria set below contain QA elements.

7-5.1 Bridge Selection Criteria

- All state bridges in which the scour code has changed since the last inspection.
- All state bridges in which the POA has changed in regards to new directions to the regions.
- All new state bridges over water.
- All state bridges with a scour code of 2 or less.

These four items will be verified for validity.

In addition, a list of 60 bridges over water will be selected randomly from the previous inspection season. Of the bridges selected, 40 of them shall have a scour code of 3, 4, or 7.

7-5.2 Office Review

- Verify that each bridge over water has a scour summary sheet, scour calculations if appropriate, a bridge layout sheet and initial ground line drawings.
- Verify that the bridge is properly coded based on scour calculations.
- Verify that each scour critical bridge has a Plan of Action and that it has clear direction for the field staff to follow.
- Review waterway adequacy code (1662) for accuracy.

7-5.3 On Site Field Review

- Verify that the scour code (1680) in the bridge inspection report is correct and that it reflects the field conditions.
- Verify that the scour note (1680) added to all bridges over water has clear and direct information.
- Verify any scour related concerns such as exposed footings, channel migration, presence or need for countermeasures.
- Verify that the POAs reflect the conditions in the field.
- Verify the channel protection code (1677) for accuracy.
- Verify that the channel protection note (1677) adequately reflects site conditions.

7-6 Regional and Special Structures Inspection Units

The responsibility of structural inspections has been divided between three supervisors within the BPO. There are two Regional Inspection Engineers that oversee the bulk of the state inventory of bridges within the state of Washington. One Special Structures Engineer oversees the more unique types of structures within the inventory.

7-6.1 Office Review of Structural Inspections

A Regional Inspection Engineer or a second Team Leader will review 100 percent of High Risk, Fracture Critical, In-Depth, Interim, Damage, Special Feature, 48-month frequency, Inventory and Local Agency inspection reports under their responsibility, with the exception being those that qualify for "Team Leader Approval." See Appendix 7-D for specific criteria. The reviews are targeted in such a manner that all Team Leaders have close to an equal number of bridges reviewed.

The Special Structures Engineer reviews 100 percent of all Special Structure reports under his area of responsibility.

The office review of reports will consist of the following validation for accuracy and consistency:

- **Inspection Type** – The appropriate inspection types are identified.
- **Inspection Date** – Ensure that bridges are inspected on time.
- **Inspection Frequency** – Verify that inspection frequency is based on condition or policy (i.e., 48-month frequency criteria).
- **Inspection Hours** – Verify that the correct inspection hours are reported based on history of previous report hours, structure type and condition.
- **Accounting Codes** – Verify that the correct accounting codes are used.
- **Organization of Report** – Verify that the report is organized, understandable, uses correct photo and file references that follow office policy.
- **Proper Inspection Forms** – Verify that the appropriate inspection forms are included in the reports.
- **Soundings and Ground Lines** – Verify if bridge requires soundings. If required, verify that soundings and ground lines are correct and completed.
- **Inspection Resources** – Verify that the appropriate resources needed for safety, access, and adequate inspection are being used.
- **NBI Codes** – Verify that the NBI codes are supported by inspection report content.
- **BMS Elements** – Verify that the BMS elements are complete and accurate.
- **BMS Condition States** – Verify that the BMS condition states are supported by the inspection report content.
- **Repair Recommendation and Priorities** – Verify that appropriate repairs and repair priorities are recommended based on inspection report content.
- **Follow-Up Actions on Significant/Critical Findings** – Ensure deficiencies that require immediate action have had the proper parties notified and are being monitored and/or followed up on.
- **Follow-Up on Damage and Critical Damage Bridge Repair Report (CDBRR) Reports** – Verify that CDBRR's and Alerts have updated information added such as future repaired dates and/or completed repairs.

Additional QC measures that are associated with the inspection program consist of the following:

- Regional Inspection Team Leaders are scheduled to inspect bridges randomly. This limits the chances of the same bridge getting inspected by the same Team Leader repetitively.
- Regional Inspection Engineers have the opportunity to review reports written by all Regional Team Leaders. The two Regional Inspection Engineers participate in a two-year rotation in which one is responsible for reviewing all Local Agency inspection reports inspected by the BPO. All Regional Team Leaders (under both Regional Inspection Engineers) are assigned to inspect these Local Agency bridges. This allows the Regional Inspection Engineer on that particular rotation to review reports and provide feedback to all Regional Team Leaders, not just the Team Leaders working under them.
- All changes made or suggested for any particular report during the QC review process must be agreed upon by the Team Leader responsible for the final submittal of the report. In the event of a disagreement, the Bridge Preservation Engineer shall intervene as arbitrator to determine a final solution to the matter.

Documentation of reports reviewed includes, but is not limited to bridge name, inspector name, date bridge inspected, date reviewed and review state (APPROVED, APPROVED AS NOTED(AAN) OR RETURN FOR CORRECTION(RFC)). Example office review forms are included in Appendices 7-E and 7-F.

7-6.2 Field Review of Structural Inspections

Each year, 2 percent of all structural inspections are selected for field review. Structures are selected from a list of current year inspections, along with a concurrent review of the prior inspection. The reviews are targeted in such a manner that all Team Leaders have close to an equal number of bridges reviewed.

During the field review, the primary focus is to evaluate the accuracy of:

- NBI inventory items.
- NBI ratings of condition codes.
- Bridge BMS elements.
- Bridge BMS element condition states.
- Written or omitted repairs.
- Proper safety procedures.
- Areas of improvement.

Field reviews allow the supervisor an opportunity to see how the various Team Leaders are evaluating structures, relative to how the supervisor would evaluate the same structure. The expectation for coding NBI data items for "Deck, Super, and Substructure," relative to the supervisors rating, are for the NBI condition codes to be within plus or minus 1 except for codes less than 5. Codes of 4 or less should not deviate at all, unless there are changed conditions warranting an updated code. For the BMS elements, there should be no missing elements. For BMS condition states, verbiage in the report should be supportive of the condition state ratings and quantities. For repairs, all repairs need to be supported by inspection findings.

All deviations from the above standard are documented, and the supervisor shall dialogue one-on-one with the Team Leader responsible for the report concerning all deviations. It is the responsibility of the supervisor to determine if more training is necessary for the Team Leader, or if other measures need to be taken to insure consistency of the bridge inspection reports. A field review form is included in Appendix 7-G.

7-7 Underwater Inspection Unit

The Underwater Inspection (UW) Unit within the BPO focuses on the structural inspection of substructure bridge elements identified to be in water deeper than 4 feet. The Special Structures Engineer has the responsibility of administering QC procedures identified below for this unit.

7-7.1 Underwater Inspection Office Report Review Process

Reviews of UW inspection reports are based on the type and condition of the bridge inspected. A complete office review is performed for all bridges that fall into one of the following categories:

- Local Agency owned.
- Washington State Ferry terminals.
- Scour critical bridges (scour code of 3 or less).
- Structures with exposed footings.
- Bridge with repairs associated with the underwater inspection findings.

The review ensures that all documentation is included to support the underwater findings. This includes:

- Correct substructure coding (based on inspection findings).
- Sketches and drawings showing the extents of underwater inspection.
- Documentation of ground lines around all piers.
- Drawings showing the location and extents of all defects.
- Drawings showing the current channel cross section.
- Repairs must be adequately described and written into the text of the inspection findings.

A UW report checklist is used to make sure the report package is complete.

7-7.2 Field Review of Underwater Bridge Inspections

The Special Structures Engineer accompanies the underwater bridge inspection team for 5 percent of all of the inspections performed each year.

7-8 WSDOT Bridge Preservation Office Quality Assurance Program

7-8.1 Purpose

To conduct an independent annual evaluation of the adequacy of the bridge and tunnel inspection program within the BPO in meeting the FHWA requirements as defined in the §650.307 through §650.315 and §650.507 through §650.515, as well as office policy, procedures and best management practices established in the WSBIM. The program will also assess the adequacy and consistency of QC procedures in place within the BPO.

7-8.2 Definitions

Quality assurance (QA) is defined in §650.305 and §650.505 as the use of sampling and other measures to assure the adequacy of QC procedures to verify or measure the quality level of the entire bridge inspection and load rating program. QA is administered from outside a work group.

7-8.3 Timeframe of the Quality Assurance Evaluation

QA will be conducted on bridges inspected in the previous inspection season. See Appendix 7-H for details on the selection process.

7-8.4 Personnel

To meet the federal requirement identified in §650.307(c), §650.313(g), §650.507(e), and §650.513(i) the BPO created a Quality Assurance Engineer (QAE) position. This position is responsible for administering the QA program. The QAE must meet the same qualifications and re-certification requirements as a TL.

7-8.5 Quality Assurance

The QA program treats the separate units within BPO as a whole to evaluate the following areas below for accuracy and consistency and produces an annual summary of findings. In addition to that, the QAE will participate in an annual office wide “Process Change” meeting, a meeting with management and staff prior to the beginning of the next inspection season. This will consist of a summary of the information that is contained in the annual report submitted to the SPM.

1. **Staff Qualifications and Re-Certification** – Document validity of qualifications and re-certification of SPM, TL, LRE and UBID based on roles and responsibilities defined in Chapter 1.
2. **Office Records and Procedures** – Review and document the accuracy and completeness of the following for those bridges selected using the selection criteria described in Appendix 7-H:
 - Contents of bridge letter and electronic files (see Appendix 7-A).
 - Load ratings.

Review of load rating information:

- Load posting at bridge matches that of load rating documentation.
- Operating level codes match legal load ratings and posting codes.
- Summary sheet in the letter file is signed and stamped by Engineer of Record (EOR).

Inspection reports:

- Appropriate report forms:
 - Fracture Critical report
 - Underwater report
 - Special Inspection report
 - Damage inspections
 - Bridges on 48-month frequency.
 - Scour Evaluation of bridges over water.
3. **Field Procedures** – Review and document the accuracy and completeness of the following for those bridges selected using the selection criteria described in Appendix 7-H:
 - Appropriate forms used.
 - NBI appraisal coding, NBI inventory data and Bridge Management System (BMS) condition state coding.
 - Inspection notes.
 - Photographs and sketches.
 - Maintenance recommendations.
 - Resources used to conduct bridge inspections.
 - Safety hazards addressed.
 4. **Data Quality** – The Coding and Appraisal Unit completes QC/QA processes that include error checks, incorporated results from FHWA provided error checks, persistent error reports, and State developed consistency, compatibility and accuracy checks.
 5. **De-certification/Reinstatement** – For process on de-certification and reinstatement see Chapter 1.
 6. **Deliverables** – A written report will be provided to the SPM prior to the beginning of the next inspection season that will include:
 - Executive summary.
 - Selection breakout by category. See Appendix 7-H for details.
 - Individual QA field and office reports for each bridge selected.
 - Findings (from both office and field procedures).
 - Recommendations to management.

7-9 WSDOT LP Quality Control/Quality Assurance Program

7-9.1 General

LP conducts quality control/quality assurance (QC/QA) reviews of local agency bridge programs statewide to:

- Verify that local agency bridge inspection programs maintain a high degree of accuracy and consistency.
- Identify future training needs.
- Ensure compliance with the NBIS.

QC reviews are conducted by both the local agency bridge owners and by LP. The LP Local Agency Bridge Inventory Engineer continually performs routine QC on the data contained in the Local Agency Bridge Inventory.

QA reviews are formal reviews of an agency that are conducted a minimum of once every five years. This formal agency review consists of both a bridge file review and the field review as detailed in Section 7-11.2. See *Local Agency Guidelines* (LAG) M 36-63 Appendix 34.57 for a copy of the checklist used by LP for this review.

7-10 WSDOT LP Quality Control Program

LP has established a set of QC procedures to be used with Local Agencies in order to maintain a high degree of accuracy and consistency within the bridge inspection program. The procedures focus on the following areas:

- Qualifications of designated bridge positions within the agency.
- Maintaining bridge information (electronic and physical information).
- Management/analysis of bridge load rating and bridge scour.
- Office review and Field verification of information and conditions detailed in bridge inspection reports.

The QC program's role and that of those involved in the process is to evaluate and communicate the assessments made directly with staff involved. Local Agency practices should be evaluated throughout this process and be addressed and adjusted accordingly in order to create a more consistent and accurate inspection program.

Quality control is defined per 23 CFR 650.305 and §650.505 as "procedures that are intended to maintain the quality of a bridge inspection and load rating at or above a specified level." QC is performed within a work group.

7-10.1 Personnel – Roles, Responsibilities, and Qualifications

The roles and responsibilities for the following local agency bridge inspection personnel are described in detail in Chapter 1. The minimum qualifications for each of these positions are described in the NBIS.

List of typical local agency bridge inspection personnel:

- Program Manager
- Team Leader
- Load Rater
- Underwater Bridge Inspection Diver

7-10.2 **Personnel – Continuing Education Requirements**

The Certified Bridge Inspector (CBI) list is managed through the Local Agency BridgeWorks bridge inspection software. Each CBI must fulfill the continuing education requirements as listed in Chapter 1 or as outlined in LAG Chapter 34 prior to the expiration date on their Local Agency BridgeWorks account and must submit their training records for review and request an extension of their Local Agency BridgeWorks account rights.

LP will also search the database for all inspectors that are due for the refresher course within the next year and notify each inspector of the need to attend the refresher course and availability of training. A CBI who does not fulfill the requirements of Chapter 1 will have their certification suspended until the inspector supplies LP with proof that they have successfully fulfilled the continuing education requirements (see Section 1-6).

7-10.3 **Maintain Bridge Information (Electronic and Physical Information)**

Each agency is responsible for maintaining a bridge file for each bridge within its jurisdiction. A detailed list of information that should be in the bridge file is listed and described in Section 2-2. In addition, agencies are required to maintain a record of other general information. This information may be requested during the QA review of the bridge inspection program. The following general information should be on file:

- An experience and training record for each lead inspector.
- A master list of all bridges within the agency's jurisdiction. This list should identify bridges that have fracture critical members, require underwater inspection, and/or warrant special inspection because of their design features, location, or strategic importance.

Physical Letter Files – The LP Local Agency Bridge Engineer will perform an annual audit by comparing a current list of bridges from the Local Agency WSBIS database against the physical letter files. All conflicts between the electronic list and the physical letter files are addressed, validating both the physical and electronic portions of the bridge files. This annual audit has three QC functions:

- Identifies physical letter files that are missing so they can be recovered.
- Validates the accuracy of the electronic database with respect to the bridges listed in the inventory.
- Ensures that records for bridges that have been added, transferred, or removed from the inventory are complete and accurate.

All physical letter files should include an individual bridge record checklist as provided in LAG Appendix 34.56.

Electronic Files – Local Agencies have the option of keeping some or all of their bridge files electronically. If an agency chooses to maintain an electronic copy, it is the local agency program manager's responsibility for scanning the signed inspection reports. The agency should review the data scanned to ensure the files are accurate and complete.

Items to be reviewed include:

- Did the agency “release” the final inspection report form:
 - Were all pages included
 - Were all inspection types listed on the first page included
 - Did the Team Leader sign the report

See LAG Appendix 34.55, for additional information that should be reviewed and included as part of an individual electronic bridge record.

7-10.4 Management/Analysis of Bridge Load Rating and Bridge Scour

Load Rating – The QC tasks for load rating are the responsibility of the LP Local Agency Bridge Engineer or the Local Agency Program Manager. A PE license is required for the individual responsible for this review. The QC tasks apply to any new load rating work to be completed on a structure or for revisions to a load rating on a structure.

QC consists of procedures defined below that assess the load rating work completed by consultants as well as by local agencies. These rules currently apply to those load ratings completed by consultants and local agencies on locally owned bridges that meet the federal definition of a bridge (NBI bridges). However, agencies are also encouraged to follow these methods for their non-NBI bridges.

A selected number of locally owned bridges (Owner code of 2, 3,4,25, or 32) that qualify as NBI bridges will be reviewed annually. A sub-set of the selected bridges will consist of a combination of Fracture Critical bridges and bridges with a Superstructure or Substructure NBI Code of 4 or less.

The QC review on all selected structures will include the following:

- Verify the bridge has been rated.
- Verify a stamped summary sheet is included in the rating file.
- Verify the inventory and operating tons match the values reported in bridge inventory through the BridgeWorks software and the posting matches the rating where needed.
- Evaluate the rating factors, do they make sense? For example, is the OL1 RF greater than OL2 or the RF for AASHTO 1 greater than HS20?

For structures that consist of a combination of Fracture Critical bridges and bridges with a superstructure or substructure NBI condition code of 4 or less, additional information will be reviewed for these structures as follows:

- Verify all elements/members that require ratings are rated.
- Verify the preliminary calculations are included in the submittal and are checked for accuracy. These files might include dead loads, factors, and any assumptions used in the calculations.
- Verify the ratings represent the condition of the structure based on the latest inspection report.
- Verify each bridge’s physical characteristics are modeled properly.
- Verify reinforcing/pre-stressing; typically check points at maximum stress.
- Verify dead and live loads are modeled properly.

Bridge Scour – The QC tasks for bridge scour are the responsibility of the LP Local Agency Bridge Engineer or the Local Agency Program Manager. The LP Local Agency Bridge Engineer will conduct an annual review on all local agency bridges in which the scour code has changed since the last inspection and on all bridges in which the scour Plan of Action (POA) has changed in regards to new directions for monitoring or implementing. These two items will be verified for validity.

The QC review on all selected structures will check the following:

- Verify each bridge over water has:
 - a scour summary sheet
 - scour calculations if appropriate
 - a bridge layout sheet
 - Initial ground line drawings
- Verify the bridge is properly coded based on scour calculations.
- Verify each scour critical bridge has a Plan of Action and that it has clear direction for the field staff to follow.

A field review is also conducted as part of the QC review on the bridges selected annually that includes the following:

- Verify the scour code in the bridge inspection report is correct and that it reflects the field conditions.
- Verify the scour code note added to all bridges over water has clear and direct information.
- Verify any scour related concerns, exposed footings, channel migration, presence or need for countermeasures.
- Verify the POAs reflects the conditions in the field.

7-10.5 Review and Validation of Inspection Reports and Data

QC reviews are conducted by both the local agency bridge owners and by LP. The LP Local Agency Bridge Inventory Engineer continually performs routine QC on the data contained in the Local Agency Bridge Inventory.

An individual bridge record specific QC check by the LP Local Agency Bridge Inventory Engineer begins after agencies conduct bridge inspections and perform their internal QC procedure. After an Agency's QC is complete, notification is made to LP by email that their bridge inspection records are ready for release to the Local Agency Bridge Inventory. Any necessary information or instructions related to their updated inspection data are also provided in this email. The Local Agency Bridge Inventory Engineer then starts the QC process on the updated, as well as the existing bridge data associated with the bridge records. This includes the following:

- A query is run on all inventory data for verification of data consistency and correct data field correlation.
- An in-depth review is run on all inventory data for verification of data consistency and correct data field correlation on all new data prior to releasing into the bridge inventory.
- A review of the inspection coding for consistency, completeness and accuracy.
- A review of additional bridge file components as they become available electronically through the bridge inspection software.
- Note any discrepancies, errors or questions.

Along with the individual inventory review:

- An evaluation of all bridge inventory data integrity is made whenever bridge information requests are made.
- Individual questions are answered daily through one-on-one instruction by phone call or email.
- Review visits with an Agency are conducted periodically with formal review visits as noted above.
- Quarterly reports are prepared from the bridge inventory data and are forwarded to the Agencies for review and action. This report lists bridges with inspections that appear to be out of date, with inspection work that needs to be completed and released, and a projection of what inspections need to be scheduled in the next quarter.

If discrepancies or errors are found the following will occur:

- A documented phone call may be sufficient to clear up the issue.
- If the error has been previously noted or is severe enough to warrant immediate action, the structure update will be returned un-released with an explanation as to why the update was not released and instructions on how to resolve the issue.
- An Excel spreadsheet of the errors found is prepared from the review notations and is sent to the Agency with instructions on how to correct their record. The updated inspection information is released and the corrections are made through an informational update or during the next inspection.
- If the review does not result in questions or concerns, the update is released without comment.

7-10.6 Reporting of Quality Control Reviews

Reporting annual results and findings of QC reviews will be as follows:

- Provide results to the Statewide Program Manager for incorporation into overall Washington QC/QA annual report by the end of October.
- Copies of all reporting and documentation of the LP QC reviews will be available at the WSDOT LP Office.

7-11 WSDOT LP Quality Assurance Program

QA reviews are formal reviews that are conducted by LP annually for bridge inspector personnel qualifications and a minimum of once every five years to verify the adequacy of the QC procedures for a local agency. The QA review is performed by the LP Local Agency Bridge Engineer as an independent reviewer from the bridge inspection team on a sample of work completed within a three-year timeframe prior and up to the time of the formal review.

Quality assurance is defined per 23 CFR 650.305 and §650.505 as “the use of sampling and other measures to assure the adequacy of QC procedures in order to verify or measure the quality level of the entire bridge inspection and load rating program”. QA is administered from outside a work group.

7-11.1 **Annual QA Review – Certified Bridge Inspector**

At a minimum, the LP Local Agency Bridge Engineer will review qualifications and re-certification records for a sample of certified inspectors within the database on an annual basis. Continued certification will be in accordance with the inspector certification process established in Chapter 1. Any suspensions of certification will be in accordance with the process described in Section 1-6.

7-11.2 **QA Review – On Local Agency QC Procedures**

The formal QA review that is conducted a minimum of once every five years consists of both a bridge file review and the field review as detailed below. This review will be performed by, or under the direction of the LP Local Agency Bridge Engineer. The agencies and structures that are selected for review are those responsible for NBIS inspections and reporting. The number of bridges to be reviewed will be determined based on agency inventory and types of structures. If an agency has a cross section of structure types and condition states a sample from all types will be included as part of the review.

Selection criteria for agencies to receive a QA review includes the following;

- Agencies responsible for NBIS inspections and reporting will have a higher priority.
- Elapsed time since last local agency QA review (maximum interval of five years).
- **Past Performance** – An agency that has had a review with minor deficiencies and/or corrections will receive higher priority; conversely agencies with a demonstrated record of high quality results will be a lower priority.
- **Condition of Bridges** – Agencies with inventories of higher risk bridges (such as bridges with low sufficiency ratings that are fracture critical or structurally deficient) will receive high priority.

Listed below are the procedures and sampling parameters that will be used in selecting bridges to review from each selected agency:

- Is the bridge load restricted?
- Bridge's deficiency status.
- Is the bridge programmed for rehabilitation or replacement?
- Does the bridge have critical findings and what is the status of any follow-up action?
- Bridges with unusual changes in condition ratings.
- Bridges that require special inspection.
- Location of bridges.

A close-out meeting will be conducted at the conclusion of each local agency QA review. Any deficiencies, as well as commendable practices will be identified for the agency at the time of the review. See Appendix 7-J for procedure on documenting an agencies deficiencies and corrective action to be taken. If no deficiencies were found during the local agency's bridge program QA review, the local agency will be informed in writing.

Office File Review – The QA office file review assesses the following items documenting the results via the checklist in LAG Appendix 34.57:

- Inspection reports.
- Verify inspections were completed by qualified staff.
- Complete and organized bridge files.

- Accurate and current master lists.
- Accurate documentation of bridge load ratings.
- Accurate documentation of scour evaluations including scour codes and a plan of action for all scour critical bridges.
- Thorough and accurate documentation of inspections performed.
- Inspection frequency as outlined by the NBIS at a minimum or agency specific defined frequencies, see LAG Appendix 34.52.
- For agencies with a Program Manager delegated by WSDOT, an in-depth review to validate the agencies QC/QA procedures.

Field Review – The field bridge inspection QA review is the second component of the overall QA review. The field review will be performed by, or under the direction of the Local Agency Bridge Engineer. Other members of the team will consist of representatives from the bridge owner agency and possibly Region Local Programs Personnel. The number of bridges the team selects will be based on a review of the agency's overall inventory and past performance. The Local Agency Bridge Engineer will consider the number of bridges in an agencies inventory when making the following decisions on the number of structures to be sampled:

- The various inspection types of structures in an agencies inventory. (i.e., fracture critical, special, underwater, routine).
- The sample reviewed should have a cross section of structures of all types of bridges within and agencies inventory. This should be at a minimum of three bridges per structure inspection type depending on the individual inventory.
- The number of bridges in poor condition. Generally, 10 percent of bridges considered structurally deficient in the Local Agency BridgeWorks Inventory should be reviewed, but not more than three will be required.
- An agencies past performance that has had a review with major deficiencies and/or corrections will have a higher priority.

The field review process will compare the bridge site condition report with the routine inspection reports as well as Fracture Critical, Underwater, and/or Complex Bridge Inspection Reports if applicable:

- General site review checklist:
 - Review Bridge Inspection Report(s).
 - NBI Appraisal Rating Items and Condition Codes (WB76).
 - BMS Element correctness and condition states.
 - Accuracy of notes.
 - Repair Recommendations.
 - Special inspections and procedures (fracture critical, underwater, complex).
 - Correct correlation of report elements.
 - Field aspects of frequency, scour, and load rating.
- One or more condition ratings are out of tolerance more than ± 1 . This will be reported on the closeout meeting and the information will also be included in the letter to the agency.
- Review Bridge Inventory Report
 - Inspection date and frequency for all reportable inspection types (WB77).
 - Additional coding not noted on the Bridge Inspection Report.

7-11.3 Reporting of Quality Assurance Reviews

Reporting results and findings of QA reviews will be as follows:

- Detailed in the Federal Aid Highway Program Stewardship and Oversight Agreement entered into by WSDOT and FHWA that is to be in place in early 2015 (pending signatures).
- Provided to the Statewide Program Manager for incorporation into overall Washington QC/QA annual report by the end of October.
- Copies of all reporting and documentation of the LP QA reviews will be available at the WSDOT LP office.

7-12 Appendices

Appendix 7-A	Bridge Letter File Contents for State Bridges
Appendix 7-B	Flowchart for Tracking New Bridges
Appendix 7-C	WSBIS Fields Maintained With Other WSDOT Database Source Information
Appendix 7-D	Bridge Preservation Office Lead Approval Criteria
Appendix 7-E	Bridge Preservation Office Quality Control Review Tracking Form
Appendix 7-F	Bridge Preservation Office Quality Control Report Review Tracking Form
Appendix 7-G	Bridge Preservation Office Quality Control Field Review Form
Appendix 7-H	Bridge Preservation Office Quality Assurance Bridge Selection Process
Appendix 7-I	Bridge Preservation Office Field Review
Appendix 7-J	LP Quality Assurance Deficiencies

State Bridge Files with 1 Divider
(w/o Underwater or Fracture Critical Inspections)

<p><u>Inside Front Cover</u> Layout Sheet & Vicinity Map Deck & Elevation Photos Load Rating Summary & Scour Summary</p>	<p><u>1st Divider Back</u> Regional Maintenance/ Repair Documentation</p>
<p><u>1st Divider Front</u> Routine Insp. UBIT Insp. Detail Photos</p>	<p><u>Inside Back Cover</u> Correspondence EQ Restrainer Plans Repair/Modification Plans</p>

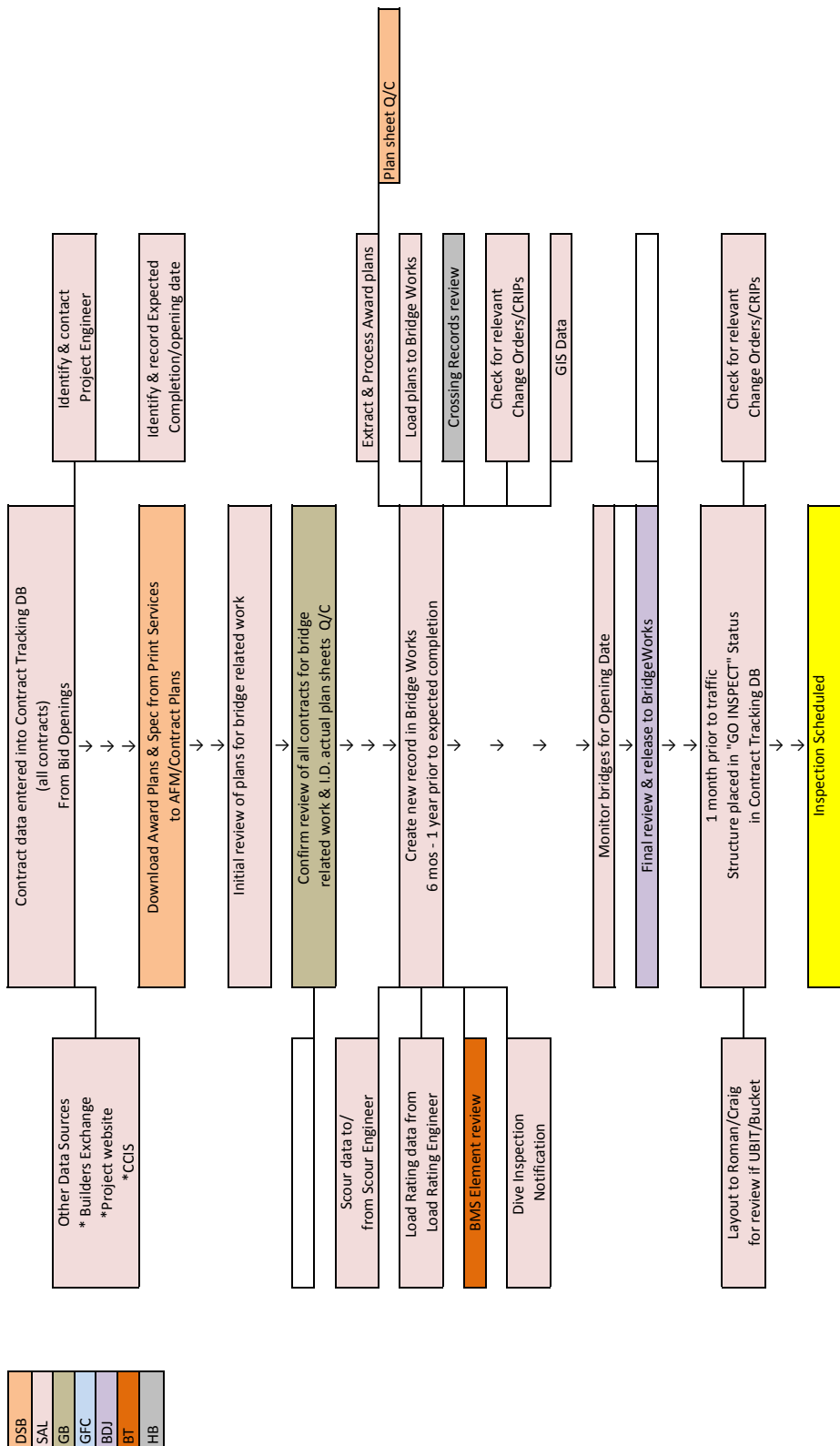
(page 1 of 2)

State Bridge Files with 2 Dividers (including Underwater and Fracture Critical Inspections)

<p><u>Inside Front Cover</u> Layout Sheet Vicinity Map Deck & Elevation Photos Load Rating Summary Scour Summary</p>	<p><u>1st Divider Back</u> Underwater Insp. Scour Reports</p>	<p><u>2nd Divider Back</u> Correspondence</p>
<p><u>1st Divider Front</u> Routine Insp. UBIT Insp. Emergency Response Insp Detail Photos</p>	<p><u>2nd Divider Front</u> Regional Maintenance/ Repair Documentation</p>	<p><u>Inside Back Cover</u> Fracture Critical Insp. EQ Restrainer Plans Repair/Modification Plans</p>

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Bridge Inventory Flow



Appendix 7-C

WSBIS Fields Maintained With Other WSDOT Database Source Information

1. Fields that BPO would like to get from TDO to check for NBI submittal:

hwy_class (char(1), null) – This code identifies what type of highway the inventoried route is one using the following:

- 1 Interstate highway
- 2 U.S. numbered highway
- 3 State Highway
- 4 County road
- 5 City street
- 6 Federal lands road
- 7 State lands road
- 8 Other (included toll roads not otherwise identified.)

serv_level_code(char(1), null) – This code describes the designated level of service provided by the inventoried route:

- 1 Mainline (most local agency bridges)
- 2 Alternate
- 3 Bypass
- 4 Spur
- 6 Business
- 7 Ramp or “Y”
- 8 Service and/or unclassified Frontage Road
- 0 None of the above

When two or more routes are concurrent, the highest class of route will be used. The hierarchy is as listed above

adt(numeric(6,0), null) – This is the Average Daily Traffic (ADT) volume carried on the route being inventoried. If bridges on a divided highway are coded as parallel, then the ADT is the volume carried on the individual bridge, not the cumulative volume carried on the route. The determined ADT volume must be no more than four (4) years old. Add leading zeros to fill all spaces in the field.

adt_truck_pct (numeric(2,0),null) – This is the percentage of the ADT volume that is truck traffic. It does not include vans, pickups, or other light delivery trucks. Code to the nearest whole percent.

adt_year(numeric(4,0), null) – This is the year in which the estimate of the ADT volume was determined. If the year entered in this field is more than four years in the past, a new ADT volume must be determined and entered in the ADT and the year the ADT was determined in this field.

Future_adt(numeric(6,0), null) – This is the ADT volume that the inventory route is expected to carry 20 years in the future. This field may be updated whenever a new projection is made. The field must be updated any time the projected date of this forecast is less than 17 years, but not more than 22 years from the current year.

Future_adt_year(numeric(4,0), null) – This is the year for which future_adt has been projected. This date must be at least 17, but no more than 22 years from the current year. If the date in this field is outside these limits, then a new value will be required for and a new year will need to be entered in this field.

strahnet_hwy(char(1),null) – For the inventory route identified indicate STRAHNET highway status using one of the following codes:

- 0 The inventory route is not a STRAHNET highway.
- 1 The inventory route is an Interstate STRAHNET highway.
- 2 The inventory route is a non-Interstate STRAHNET highway.
- 3 The inventory route connects with a Department of Defense facility.

nat_truck_ntwrk_flag(char(1),null)

fed_hwy_system_code(char(1),null) – This item shall be coded for all records in the inventory. For the inventory route identified indicate whether the inventory route is on the NHS or not on that system. This code shall reflect an inventory route on the NHS as described in the TRANSPORTATION EQUITY ACT FOR THE 21ST CENTURY (TEA21).

If more than one federal aid highway is carried on or under the bridge, indicate only the classification of the more primary route.

- 0 Inventory Route is not on the NHS.
- 1 Inventory Route is on the NHS.

fed_functional_class(class(2),null) – This code describes the Federal Functional classification of the inventory route as classified according to Statewide National Functional Classification System maps. Statewide National Functional Classification System maps are located at local agency planning departments or WSDOT Service Center Planning.

Separate codes are used to distinguish roadways located in rural or in urban areas. Routes shall be coded rural if they are not inside a designated urban area, Codes 08, 09, and 19 are for off-system roads.

Rural Codes

- 01 Principal Arterial – Interstate
- 02 Principal Arterial – Other
- 06 Minor Arterial
- 07 Major Collector (Federal Aid Secondary)
- 08 Minor Collector
- 09 Local

Urban Codes

- 11 Principal Arterial – Interstate
- 12 Principal Arterial – Other Freeway or Expressway
- 14 Other Principal Arterial
- 16 Minor Arterial
- 17 Collector
- 19 Local

fed_lands_hwy_code(char(1),null) – This code identifies bridges on roads which lead to and traverse through federal lands. These bridges may be eligible to receive funding from the Federal Lands Highway Program. Use one of the following codes:

- 0 Not Applicable
- 1 Indian Reservation Road (IRR)
- 2 Forest Highway (FH)
- 3 Land Management Highway System (LMHS)
- 4 Both IRR and FH
- 5 Both IRR and LMHS
- 6 Both FH and LMHS
- 9 Combined IRR, FH, and LMHS

For definition of IRR (Indian Reservation Roads), see Title 23 USC Section 101.

2. Fields BPO would like to get from TDO if available:

Region_code(char(2),null) – This is a two-digit code, which identifies the WSDOT region in which the bridge is located.

County_id(int,null) – This is a two-digit code, which identifies the county in which the bridge is located. If this is a jointly owned bridge, the county that is responsible for reporting the data to the inventory should be entered here. Use one of the following codes.

City_id(int,null) – This is the city in which the bridge is located. (Codes for cities and towns are identified according to the most recent U.S. Bureau of the Census Identification Schedule.) Contact the Bridge Engineer for Local Agencies for newly incorporated municipalities. If the bridge is outside of corporate limits or in an unincorporated city, code all zeros.

Leg_dist_code_1(int, null) – This field identifies the first or only State Legislative District in which the bridge is located. If the legislative district number is followed by a letter (District 19A, for example), disregard the letter and enter the two-digit number only

Leg_dist_code_2(int, null) – For bridges which span a State Legislative District dividing line, use this field to identify the second State Legislative District number. Use both this and the Legislative District Number (1) field to enter the two separate State Legislative District numbers. If no code is applicable, enter all zeroes.

speed_limit(tinyint, null) – Speed limit on the bridge.

- These are coming from the Data Mart process...an ARM value is returned as well.
- These are going to be populated by HPMS.

Appendix 7-D Bridge Preservation Office Lead Approval Criteria

Please use the following criteria to help you determine which reports can be sent directly to the Bridge Information Group without further review by a supervisor or a second Lead.

A “Bridge Inspection Report” that fits any one of the following nine criteria must be reviewed by a Regional Bridge Inspection Engineer or a second Lead Inspector.

1. If NBI codes for Deck Overall, Superstructure or Substructure are less than “6”.
2. Structures with repairs or conditions to be monitored (excluding ‘J’ type repairs).
3. New bridge structures (Inventory Inspections).
4. Fracture Critical bridges.
5. Local Agency bridges.
6. UBIT Bridge Inspections.
7. Any inspection with a frequency >24 months.
8. Any bridge that is currently having issues with scour.
9. Any time an inspection/report type and/or frequency is either changed, added, or deleted.

Additionally, the Lead may submit for review any report that the Lead feels needs further input from the Regional Bridge Inspection Engineer.

If the “Bridge Inspection Report” does not meet any of these criteria, then the “Bridge Inspection Report” can be routed by the experienced Lead Inspector to the Info Group for processing.

For quality assurance reasons, the “Bridge Inspection Report” can be randomly reviewed at the Regional Bridge Inspection Engineer’s option.

Bridge Preservation Office Quality Control Review Tracking Form

2011 Inspection Report Status

Total	Structure ID	Bridge Number	Bridge Name	Lead Inspector	CO-Inspector	Inspection Date	Date Received	Non UBIT Totals = 10						UBIT Totals= 10					Returned to Lead
								Routine	Short	Damage	Interim	Safety	Hours	Routine	Interim	F.C.	Special	UBIT Hours	
1	0009245A	16/120	OLYMPIC DR NW OVER SR 16	WDS	HDR	1/4/11	1/6/11	8	0	1	0	1	10.5	3	1	6	0	107.5	1/6/11
2	0017677A	285/10P	GEORGE SELLAR PED TUNNEL	GAS	GAS	1/8/11	3/21/11					1	1.0						3/22/11
3	0013077C	2/101	SLOUGH	DCC	TKK	4/7/11	5/4/11	1					1.0						5/6/11
4	0013077D	2/102	STREAM	DCC	TKK	4/7/11	5/4/11	1					1.0						5/6/11
5	0006347A	9/117	SNOHOMISH R OVERFLOW	DCC	TKK	4/7/11	5/4/11	1					1.0						5/6/11
6	0006375C	405/103E	228TH ST OC	DCC	TKK	4/4/11	5/4/11	1					1.0						5/6/11
7	0006375D	405/103W	228TH ST OC	DCC	TKK	4/4/11	5/4/11	1					1.0						5/6/11
8	0006673D	512/23N	FRUITLAND AVE OC	DCC	TKK	4/4/11	5/4/11	1					1.0						5/6/11
9	0006673C	512/23S	FRUITLAND AVE OC	DCC	TKK	4/4/11	5/4/11	1					1.0						5/6/11
10	0008761A	522/142	SR 522 OVER W MAIN ST	DCC	TKK	4/7/11	5/4/11	1					1.0						5/6/11
1	0003477A	285/10	SEN. GEORGE SELLAR BR.	GFC	ABK	1/8/11	1/24/11									1		28.0	1/27/11
2	0002001B	2/215	WENATCHEE R	DCC	TKK	4/5/11	5/4/11									1		7.0	5/10/11
3	0002657A	207/4	WENATCHEE RIVER	DCC	TKK	4/6/11	5/4/11									1		8.0	5/10/11
4	0008116A	5/345W	NISQUALLY R	DAG	AES	4/17/11	5/4/11									1		14.0	5/10/11
5	0013731C	504/36	MARATTA CREEK	RAA	RCD	5/5/11	5/7/11							1				2.5	5/12/11
6	0005358A	509/30	DRY GULCH	RAA	RCD	4/30/11	5/7/11								1			1.0	5/12/11
7	0013620A	504/27	HOFFSTADT CREEK	RAA	RCD	5/5/11	5/6/11									1		23.0	6/6/11
8	0002069A	5/345E	NISQUALLY RIVER	RAA	RCD	5/1/11	5/6/11									1		18.0	6/7/11
9	0008175E	167/127E	BN RR OC (NP)	RAA	RCD	5/1/11	6/8/11							1				3.0	6/8/11
10	0008175F	167/127W	BN RR OC (NP)	RAA	RCD	5/1/11	6/8/11							1				3.0	6/8/11

Bridge Preservation Office Quality Control Report Review Tracking Form

2011 REPORT REVIEW STATUS

REVIEW DATE	REPORT DATE	006/115	INSPECTOR	APPROVAL STATUS	COMMENTS
03/26	02/28	006/101	FPP/WAW	AAN	
03/29	03/19	099/540NB	DCC/GAS	AAN	
03/29	03/19	099/540SB	DCC/GAS	AAN	
03/30	03/20	099/540W-S	DCC/GAS	APPROVED	
03/30	03/07	08507600	WDS/AES	AAN	LA Centralia
03/30	03/21	08039100	WDS/TJN	APPROVED	LA Klickitat County
03/30	03/21	08118500	WDS/TJN	AAN	LA Klickitat County
03/30	03/08	08201200	WDS/AES	AAN	LA Lewis County
03/31	03/24	08647200	WDS/SMP	AAN	LA State Park
03/31	03/23	08276000	WDS/TJN	AAN	LA Clark County
03/31	03/22	0012160A	WDS/TJN	AAN	LA Skamania County
03/31	03/22	08218700	WDS/TJN	AAN	LA Klickitat County
03/31	03/07	08288400	JED/TJN	AAN	LA Yakima County
04/01	03/08	08396900	JED/TJN	AAN	LA Yakima County
04/01	03/07	08651000	JED/TJN	AAN	LA Yakima County
04/04	03/17	08271700	DAG/TJN	AAN	LA Cowlitz County
04/04	03/15	08557500	DAG/TJN	AAN	LA Cowlitz County
04/04	03/15	08558400	DAG/TJN	AAN	LA Longview
04/04	03/03	0009236C	DAG/TKK	APPROVED	LA Cowlitz County
04/05	03/03	167/112W	DAG/TKK	AAN	
04/05	02/28	167/110	DAG/TKK	AAN	
04/05	03/03	167/116	DAG/TKK	APPROVED	
04/05	03/03	167/112W-N	DAG/TKK	AAN	
04/05	03/03	167/111W-N	DAG/TKK	AAN	
04/05	03/02	167/123W	DAG/TKK	AAN	
04/05	03/02	167/129	DAG/TKK	AAN	
04/05	03/02	167/131.25	DAG/TKK	AAN	
04/05	03/28	0010756A	DAG/TKK	AAN	LA Cowlitz County
04/05	03/29	08492300	DAG/TKK	AAN	LA Cowlitz County
04/05	03/14	0003093A	DAG/TKK	AAN	LA Kelso
04/06	03/09	08230200	WDS/AES	AAN	LA Cowlitz County
04/06	03/31	08164100	DAG/TKK	AAN	LA Cowlitz County
04/06	03/03	005/626.5A	JHL/RCD	APPROVED	
04/06	03/01	020/223N	JHL/RCD	APPROVED	
04/06	03/02	005/706	JHL/RCD	AAN	
04/06	03/03	005/651W	JHL/RCD	AAN	
04/06	03/02	005/708	JHL/RCD	AAN	
04/06	03/03	005/726E	JHL/RCD	APPROVED	

void under south approach

Appendix 7-G

Bridge Preservation Office Quality Control Field Review Form

Field Review

2012 WASHINGTON STATE QUALITY CONTROL REVIEW

Bridge Number: _____

Bridge Name: _____

Inspectors: _____

QC Reviewer: _____

Inspection Date: _____

Frequency: _____

Previous Report Date: _____

Description of Quality Control Method

Are all the applicable FHWA items for the structure properly coded?

Yes _____ No _____

Are all the BMS elements for the structure correctly identified?

Yes _____ No _____

Are all the BMS element condition states for the structure properly coded?

Yes _____ No _____

Do the BMS codes support the NBI Codes?

Yes _____ No _____

Field Review

**2012 WASHINGTON STATE
QUALITY CONTROL REVIEW**

Bridge Number: _____

Bridge Name: _____

Inspectors: _____

QC Reviewer: _____

Inspection Date: _____

Does the verbiage within the report support the condition states? Yes _____ No _____

Were proper safety procedures practiced? Yes _____ No _____

Are the existing repairs supported by the inspection findings? Yes _____ No _____

Are improvement processes necessary? Yes _____ No _____

Appendix 7-H Bridge Preservation Office Quality Assurance Bridge Selection Process

The following table identifies categories used to help evaluate whether or not the random selection is representative sample of the previous seasons inspections. If a particular category is not considered to be covered sufficiently, additional bridges can be traded out in order to establish more representative coverage. The selection set for the office and field review will include a minimum of 100 bridges of the previous year's inspections. Like the NBIP compliance review trips performed in Washington state, the QA selection process as of 2014 uses a three-year cycle in which bridges are selected from two different regions each year. In this three-year cycle, a random set of bridges are selected and receive a QA inspection from each of the six regions. In addition to this cycle and due to the number of bridges in the Northwest Region, a smaller sampling of bridges (one or at most two inspection trips depending on complexity of bridges) will be selected from this region. This will be done in the off cycle years in order to maintain a representative sample of bridges within that region in the overall three-year cycle.

The three-year cycle will pair up the following regions:

- SCR and EAR (includes a small set in NWR)
- OLR and SWR (includes a small set in NWR)
- NWR and NCR

The final list developed prior to generating a random sample is screened for inspection types that consist of Routine, Safety or Short Span type inspections. The list is also screened for bridges that have been previously QA'd. Once a final list of bridges is developed, a random list is generated. The first 100 bridges are selected and represent the final short list for QA office and field review for that year. This final short list is then validated for reasonable representation of the categories listed below.

As an option, a minimum of five bridges previously receiving a quality assurance review, excluding work from the previous QA inspection season, can be added to the final short list for the season. The goal of doing this is to validate whether or not suggested changes in the report that reflect correct office procedures and federal requirements have been implemented or not. These bridges may be chosen by the QA Engineer to best fit within proximities of the randomly selected bridges.

- | | |
|-------------------------|--|
| • Region | • By Team Leader |
| • Scour Code | • NBI Reportable |
| • Primary Material Type | • Sufficiency Rating |
| • Open/Closed/Posted | • Bridge Length |
| • Primary Design Type | • Structurally Deficient/Functionally Obsolete (SD/FO) |
| • Year Built | • High Risk |
| • Inspection Type | |
| • Inspection Frequency | |

BPO Scope of Field Review

The selection process above does not eliminate any bridges because of size or complexity. The typical bridge will be inspected in its entirety. However, the scope of field review for larger and more complex bridges is entirely a different matter. The process for QA inspection for these types of structures will be more case by case. The idea will be that some of all of the components for these particular bridges will be inspected. The QA process should consider both time and size in determining how to reach this goal for these types of bridges. Traffic windows, lane closure manpower, species windows, and equipment availability are other factors that will influence the ability for one QA team to accomplish a smaller scale inspection of a larger more complex structure.

Appendix 7-I Bridge Preservation Office Field Review

The following is a list of contents in a typical bridge file for structures owned by the State of Washington which also includes Washington State Ferries (WSF) structures.

- Letter file contents include:
- Deck and Elevation Photos (More recent photos are stored on BEIS)
- Vicinity map
- Load Rating summary sheet
- Scour Summary sheet**
- Signed Inspection reports
- Fracture Critical report*
- Underwater (U/W) report*
- WSBS forms (in file drawer)
- Correspondence
- Maintenance records
- Plan sheets (Most plans are stored on BEIS)

*For bridges with underwater and/or fracture critical inspections.

**For bridges over water.

Appendix 7-J LP Quality Assurance Deficiencies

LP has established a procedure for documenting and reporting deficiencies found during Quality Assurance reviews of a local agency.

If deficiencies exist, the local agency will be sent a letter or email requesting that any missing documentation be submitted or provide a plan of corrective action, for LP's approval, to correct the deficiency within 60 days. This notification will be first in the form of email or other correspondence with the LP Bridge Office. If corrections are not made within 60 days of notification, the second notification will be a formal letter of non-compliance from the LP Engineering Services Manager.

Finally, failure to carry out the plan of corrective action will result in formal notification from the Director of LP that federal funds may be restricted until compliance is met. If continued deficiencies are found in subsequent reviews of the agency's procedures, management practices, or systems, or if specific inspection errors continue, LP will work with the agency to further determine the cause of the problems and will recommend additional training for the both the Bridge Program Manager and the Bridge Inspection Team Leader

When a local agency is notified of deficiencies to correct, the LP Local Agency Bridge Engineer will notify and include the Statewide Program Manager (SPM) on all plans of corrective action and status updates to the plans of corrective action.

8-1 General

The National Bridge Inspection Standards (NBIS), 23 CFR 650, requires that complex bridges have specialized inspection procedures, and additional inspector training. These structures have numerous mechanical and electrical systems requiring inspection, troubleshooting, repair, and rehabilitation. This chapter serves as a guideline to illustrate inspection and reporting procedure as followed by the Complex Bridge and Tunnel section of the Bridge Preservation Office.

8-1.1 References

Inspection staff may refer to the most current editions of the following:

- AASHTO LRFD Movable Highway Bridge Design Specifications
- AASHTO Movable Bridge Inspection, Evaluation, and Maintenance Manual
- AASHTO Standard Specifications for Movable Highway Bridges, 1988
- FHWA Bridge Inspector's Manual for Movable Bridges IP 77-10
- Emergency Operations Manual M 54-11
- Blue Ribbon Commission, Resolution No. 398

8-1.2 Definitions

Some definitions for use with this chapter are as follows:

Complex Bridge – Complex bridges are defined in the NBIS as movable, suspension, cable stayed, and other bridges with unusual characteristics.

Complex bridges in Washington are referred to as “Special Feature” bridges where discussed in other chapters of this manual.

Complex Tunnel – Complex tunnels are defined in this manual as tunnels characterized by advanced or unique structural elements or functional systems.

National Bridge Inspection Standards (NBIS) – Title 23 Code of Federal Regulations 650 Part C defines the NBIS regulations, and establishes requirements for inspection procedures, frequency of inspections, qualifications of personnel, inspection reports, and preparation and maintenance of a state bridge inventory. The NBIS apply to all structures defined as bridges located on all public roads.

National Tunnel Inspection Standards (NTIS) – Title 23 Code of Federal Regulations 650 Subpart E defines the NTIS regulations, and establishes requirements for inspection procedures, frequency of inspections, qualifications of personnel, inspection reports, and preparation and maintenance of a state tunnel inventory. The NTIS apply to all structures defined as highway tunnels located on all public roads.

See Section 1-1.1 for additional definitions used in this manual.

8-2 Description of Complex Bridges and Tunnels

In accordance with the description of the Bridge Inspection Organization offered in Section 1-2, a bridge inspection program/tunnel inspection program as required by the NBIS and NTIS has been constructed to ensure safe and reliable operation of electrical/mechanical systems present on the complex bridges and tunnels listed in Appendix 8-E.

The Complex Bridge and Tunnel section is staffed by individuals, specialized in electrical or mechanical engineering, who have defined roles and responsibilities. Their roles and qualifications are as follows:

8-2.1 *Delegated Program Manager (DPM)*

A delegated program manager assumes some functions for the statewide program manager for the selected subset of structures under their direct control. To qualify as a delegated program manager, the individual must meet, at a minimum, the requirements as follows:

1. The individual in charge of the organizational unit that has been delegated the responsibilities for bridge inspection, reporting, and inventory shall possess the following minimum qualifications:
 - a. Be a registered professional engineer in the State of Washington; or
 - b. Have a minimum of 10 years' experience in complex bridge or tunnel inspection assignments in a responsible capacity.

Note: Although DPMs perform functions for the bridge inspection organization, overall responsibility for NBIS compliance still resides with the Statewide Program Manager.

8-2.2 *Electrical/Mechanical Complex Bridge Lead Inspector (CBLI)*

A CBLI is in charge of inspections and is responsible for planning, preparing, performing the field inspection of bridges, and reporting observations/findings. The CBLI also makes repair recommendations and is responsible for initiating the critical damage procedures including full bridge or tunnel closure if deemed necessary. To qualify as a CBLI, the individual must meet, at a minimum, the requirements as follows:

- (a) An individual in charge of an inspection team shall possess the following minimum qualifications:
 - (1) Be a registered professional engineer in the State of Washington.
 - (2) Have a minimum of 4 years' experience in complex bridge or tunnel inspection.

A continued certification of complex bridge inspection personnel has been developed in order to ensure that all program managers and CBLIs are kept up to date with the latest practices and technology in the areas of complex bridge and tunnel inspections. The continued certification of complex bridge inspection personnel is detailed in Appendix 8-D.

8-3 Inspections

Several different types of inspections are in place to adhere to the requirements of the NBIS and NTIS. This section identifies and describes the inspection types and reporting procedures used for mechanical and electrical inspections by the Bridge Preservation Office (BPO).

8-3.1 Routine Inspections

Regularly scheduled comprehensive safety and operational reliability inspections encompassing all mechanical/electrical elements of the structures listed in Appendix 8-E. Routine inspections are performed by a licensed professional engineer to evaluate safety as well as whether the electrical and mechanical systems are performing as designed, identify any changes from initial or previously recorded conditions, and ensure that electrical and mechanical components of structures pertaining to the Complex Bridge and Tunnels section continue to satisfy present service requirements.

1. **Frequency** – Routine electrical and mechanical inspections are conducted at least once every 24 months as required by NBIS, Section §650.311. Every complex bridge is inspected annually as required by the *Transportation Structures Preservation Manual*, Bridge Inventory and Inspection Rules.
2. **Inspecting Methodology** – Critical electrical and mechanical components are visually and operationally inspected. Non-destructive testing methods adhering to guidelines established by the AASHTO Movable Bridge Inspection, Evaluation, and *Maintenance Manual* Chapter 2, are used in evaluation of bridge components as well. Following these procedures throughout routine inspections helps ensure the safety and operational reliability of the mechanical and electrical systems by providing a thorough and comprehensive inspection.
3. **Inspection Report** – A routine inspection report (RIR) shall be prepared at the completion of each routine inspection to record the inspection findings, provide a narrative description of conditions at the site, and note any changes in the WSBIS coding information. The CBLI shall record and submit the findings of the routine inspection into BridgeWorks as follows:
 - a. At the conclusion of the routine inspection, confirm the Numerical Rating Condition (NRC), Appendix 8-C, coding for the various elements and make any changes necessary. Complete the narrative portion corresponding to any condition rating change describing the existing condition of its respective element.
 - b. Enter onto the inspection report: CBLI initials, CBLI identification number, date of inspection, total number of crew hours at the site, average bridge openings per month since last inspection, average marine traffic bridge openings per month since last inspection, average maintenance bridge openings per month since last inspection, and the number of inspection bridge openings.
 - c. Prepare a list of elements in need of repair and recommend the type of repair that should be done. A photo of repair areas should be taken with each type of recommended repair. Assign each repair a priority level. Text describing each repair should appear in the relevant element description. Deficiency photos are to be referenced in the column alongside the element description as well as the repair.

8-3.2 **Blue Ribbon Inspections**

Shall be unannounced random inspections intended to assess the reliability of the mechanical and electrical systems, identify needed preventative maintenance activities and develop the scope of required rehabilitation projects on the floating bridges. Blue ribbon inspections and the corresponding reports are completed by consultants considered to be experts in their field, managed by CBLs, in accordance with Resolution No. 398. When blue ribbon electrical and mechanical inspections are performed, they are used in conjunction with the routine inspection for that structure.

1. **Frequency** – Due to permissions granted by the Bridge and Structures Engineer in 1994, blue ribbon inspections shall be conducted unannounced at least once every two years. This augmentation to the original annual inspection schedule recommended by Resolution No. 398 is provided in the memo in Appendix 8-A.
2. **Inspection Methodology** –Blue ribbon inspections consist of visual and operational inspection of the electrical and mechanical systems. Disassembly of electrical and mechanical components for closer inspection is also conducted throughout these inspections to gather a higher level of detail than is typical in the routine inspections. Non-destructive testing methods adhering to guidelines established by the AASHTO *Movable Bridge Inspection, Evaluation, and Maintenance Manual* Chapter 2, are used in evaluation of bridge components as well. Following these procedures throughout blue ribbon inspections helps ensure the safety and operational reliability of the mechanical and electrical systems by providing a thorough and comprehensive inspection.
3. **Reporting** – After completion of a blue ribbon inspection a RIR is to be entered into BridgeWorks in the same fashion as outlined in Section 8-3.1.3. In addition to this RIR another inspection report is to be generated by a consulting engineer. Consultant reports are detailed reports to be formatted as dictated by the document provided in Appendix 8-B. These reports include identified deficiencies, recommended actions to correct deficiencies, and cost estimates to complete recommended rehabilitation items. The DPM will coordinate the implementation of the recommended repairs and rehabilitation items with the Region maintenance staff.

8-3.3 **In-Depth Inspection**

Shall be a close-up inspection of one, several, or all electrical and mechanical elements to identify any deficiencies not readily detectable using routine inspection procedures. The results of these inspections are used to assess the reliability of mechanical and electrical systems, identify needed preventative maintenance activities, review and correct as-built schematics, review and correct OIM manuals, and develop the scope of required rehabilitation projects. In-depth electrical and mechanical inspections are used in conjunction with the routine inspection. Consultants, specialized in the specific field of interest, are used in conducting these inspections due to constant change in demand of disciplines, equipment, and vendors needed to accomplish the various in-depth inspections. Consulting engineers are managed by CBLs in the same manner as those used in blue ribbon inspections.

1. **Frequency** – An in-depth inspection shall be performed in conjunction with a routine inspection every six years in accordance with the *AASHTO Movable Bridge Inspection, Evaluation, and Maintenance Manual* Section 2.1. An in-depth inspection may also be performed as a follow-up inspection to a routine or blue ribbon inspection to better identify any deficiencies found. The first inspection on a new or rehabilitated structure shall be an in-depth inspection in order to establish a detailed baseline for the structure file.
2. **Inspection Methodology** – In-depth inspections consist of visual and operational inspections of the electrical and mechanical systems. Extensive disassembly of electrical and mechanical components for closer inspection is conducted throughout these inspections to gather a higher level of detail than is typical in blue ribbon and routine inspections. Non-destructive testing methods adhering to guidelines established by the *AASHTO Movable Bridge Inspection, Evaluation, and Maintenance Manual* Chapter 2, are used in evaluation of bridge components as well. Following these procedures throughout in-depth inspections helps ensure the safety and operational reliability of the mechanical and electrical systems by providing a thorough and comprehensive inspection.
3. **Reporting** – After completion of an in-depth inspection an RIR is to be entered into BridgeWorks in the same fashion as outlined in Section 8-3.1.3. In addition to this RIR another inspection report is to be generated by a consulting engineer. Consultant reports are detailed reports to be formatted as dictated by the document provided in Appendix 8-B. These reports include identified deficiencies, recommended actions to correct deficiencies, and cost estimates to complete recommended rehabilitation items. The DPM will coordinate the implementation of the recommended repairs and rehabilitation items with the Region maintenance staff.
4. **Specialized Inspections** – Occasionally certain components/systems have their own specialized inspections carried out separately. Examples of components/systems that may require special inspections are trunnion bearings, counterweight ropes, and cathodic protection. Each of these inspections is functionally an in-depth inspection, pertaining only to that component or system, which are conducted and reported as such.

8-4 Complex Bridge and Tunnel QC/QA Program

The CBLs review 100% of inspection reports under their responsibility prior to release. The majority of inspections involving the Complex Bridge and Tunnel section only concern one inspection engineer of each discipline. If multiple CBLs of the same discipline participated in an inspection then that report will be reviewed by both engineers prior to submittal to the DPM.

An effort shall be made to rotate which CBLs conduct routine inspections on each structure on an annual basis to add variation to the Complex Bridge and Tunnel section's internal QC program.

The DPM reviews 100% of all Complex Bridge and Tunnel reports under his area of responsibility prior to release.

The office review of reports will consist of validation for accuracy and consistency of the following:

- **Inspection Type** – The appropriate inspection types are identified.
- **Inspection Date** – Ensure that bridges are inspected on time.
- **Inspection Frequency** – Verify that inspection frequency is based on condition or policy (i.e., 12 month frequency criteria).
- **Inspection Hours** – Verify that the correct inspection hours are reported based on history of previous report hours, structure type and condition.
- **Organization of Report** – Verify that the report is organized, understandable, uses correct photo and file references that follow office policy.
- **Inspection Resources** – Verify that the appropriate resources needed for safety, access, and adequate inspection are being used.
- **NRC Codes** – Verify that the Numerical Rating Condition codes are supported by inspection report content. Coding information available in Appendix 8-C.
- **Elements** – Verify that the elements are complete and accurate.
- **Repair Recommendations and Priorities** – Verify that appropriate repairs and repair priorities are recommended based on inspection report content.
- **Follow-Up Actions on Significant/Critical Findings** – Ensure deficiencies that require immediate action have had the proper parties notified and are being monitored and/or followed up on.

Utilizing consultants on blue ribbon and in-depth inspections serves to act as QA for the Complex Bridge and Tunnel section. An effort is made to rotate which consultant conducts each blue ribbon or in-depth inspection. This process helps to ensure delivery of a comprehensive and high quality inspection program.

8-5 Tunnel Inspection Duties

On July 6, 2012 the President signed the Moving Ahead for Progress in the 21st Century Act (MAP-21), which required the Secretary to establish national standards for tunnel inspections. As a result, the FHWA has issued the National Tunnel Inspection Standards (NTIS) for highway tunnels. The BPO is working to establish a program to meet the intent of the NTIS. As such, routine inspections of the electrical and mechanical systems present in highway tunnels are to be conducted at a maximum of 24 month intervals. Routine inspections result in an inspection report created and submitted through Bridge Works. In-depth inspections result in detailed consultant reports that are reviewed by CBLIs in addition to a standard RIR. In-depth inspections of the mechanical and electrical systems are to be conducted at least once every six years. Maintenance and inspection guidelines for mechanical and electrical systems present in tunnels are outlined in the FHWA *Tunnel Operations, Maintenance, Inspection and Evaluation (TOMIE) Manual*. Each tunnel has its own structure file similar to that of our other complex bridges and tunnels which are updated with signed copies of applicable reports.

8-6 Complex Bridge and Tunnel Records

8-6.1 Operation, Inspection and Maintenance Manuals

Every complex bridge has its own *Operation, Inspection, and Maintenance (OIM) Manual* developed by the Bridge Preservation Office as mandated by *Transportation Structures Preservation Manual* M 23-11. These are developed partially using the Operations and Maintenance (O&M) manuals provided to WSDOT as a result of *Standard Specifications* Section 1-06.5. O&M manuals consist of catalog cuts or shop drawings of each piece of equipment found on its corresponding structure. Both of these manuals as well as any as-builts must be periodically updated as structures are rehabilitated and the information contained within them becomes obsolete. Region(s) input is invaluable in the process of creating OIM manuals and correctly identifying operating procedures for each structure. Contract documents, special provisions, and as-builts are also used in the process of generating the OIM manual.

OIM manuals contain important information relevant to their corresponding complex bridge including but not limited to specific operational procedures, emergency procedures, recommended maintenance scheduling and procedure, as well as inspection procedures. Master copies of each OIM manual are retained by the BPO and the regions are provided with copies of every manual relevant to their bridges. A complete list of OIM manuals developed by the BPO is included in Appendix 8-F.

8-6.2 Structure Files

Every complex bridge and tunnel has its own structure file maintained in accordance with the standards set in Chapter 2 of this manual to satisfy the FHWA. The physical location of structure file documents is indicated in Appendix 2-A “Bridge Preservation Floor Plan.” A more detailed explanation of the legend is as follows:

- “B- Movable Bridge Files” refers to project files, signed copies of every bridge inspection report, contract documents, microfilm cards and antiquated pictures from old inspections.
- “F-Letter Files” refers to the movable bridge letter files as well as reports generated by consultants. These reports are the original stamped and signed copies that come as a result of a Blue Ribbon inspection or an In-Depth inspection.

The current Routine and In-Depth inspection databases containing inspection dates and intervals for scheduling purposes are available to view on the Corporate drive. These files are only editable by members of the Complex Bridge and Tunnel section. These databases are available along the following file path on the Corporate drive: \Data\Bridge\Movable. Folders labeled “Routines” and “In-Depth Database” contain the relevant files.

8-7 Bridge Damage/Emergency Responsibilities

As dictated in the WSDOT *Emergency Operations Plan* M 54-11 BPO personnel are provided with emergency responder training. The BPO employs multiple mechanical and electrical engineers with offset schedules such that in the event of an emergency situation involving an electrical or mechanical component failure, personnel will be available to provide technical assistance to the Region(s). Should an emergency situation occur the Region(s) are to contact the BPO at which point technical assistance will be dispatched. After any emergency response situation the CBLI onsite for the incident shall prepare a report to be distributed amongst the BPO and the Region(s) via email. The BPO can always be reached via the emergency response phone at 360-480-4500.

8-8 Plans, Specifications and Estimates


The BPO assists the region with preparation of Plans, Specifications & Estimates documentation for the purpose of special inspections, requiring consultants, as well as rehabilitation activities. In the event electrical and mechanical components need to be acquired through the bidding process, the BPO provides assistance to the region with preparation of the proper documentation. During construction of repairs or rehabilitation of structures the BPO is available to assist the Region(s) and the Project Engineer Office as needed.

8-9 Appendices

Appendix 8-A	BPO Memo for Blue Ribbon Inspection Schedule Alteration
Appendix 8-B	Guideline for Writing Electrical and Mechanical Inspection Reports
Appendix 8-C	Numerical Rating Condition Description
Appendix 8-D	Continued Certification of Bridge Inspection Personnel
Appendix 8-E	Complex Bridge and Tunnel Inspection List
Appendix 8-F	Operations, Inspection, and Maintenance Manual List

Appendix 8-A

BPO Memo for Blue Ribbon Inspection Schedule Alteration

S.F. 80  ROUTING SLIP
SF 80 F

DATE 28-99

TO ORG

ADDRESS MAY 31 1994

FROM MML

PT. OF TRANSPORTATION MAINTENANCE

MAIL STOP 100

PHONE 509-835-1000

<input type="checkbox"/> For Action	<input type="checkbox"/> Per Your Request	<input type="checkbox"/> Per Our Conversation
<input type="checkbox"/> For Approval	<input type="checkbox"/> Read and Return	<input type="checkbox"/> Read & Route to Files
<input type="checkbox"/> For Signature	<input type="checkbox"/> For Your Information	<input type="checkbox"/> For Your Comments

The random inspection shall include an element of "surprise" and an element of "independence" to and from the regular maintenance folks and their activities. Are we accomplishing this?

Please include me in the random inspections that are coming up. Thanks.



Washington State
Department of Transportation

Memorandum

Date: May 10, 1994

From: O. R. George ^{ORG}
Phone: 753-4739

Subject: Proposed Schedule For
Floating Bridge Random
Inspections

To: M. Myint Lwin
Bridge & Structures - 7340

Random inspections of the four floating bridges are conducted by our office as outlined in the attached June 8, 1993 memorandum from A. H. Walley to S. A. Moon. We propose to delay the mechanical and electrical inspections on the Evergreen Point Bridge (520/8) until 1995 due to the major mechanical and electrical renovations taking place this summer. Inspections by our office during the construction phase would be redundant since the designer, Sverdrup Corporation will be assisting with construction services.

We also propose to conduct the first electrical random inspection on the Lacey V. Murrow Bridge (90/25S) in 1995. This first inspection will be within 2 years of opening the bridge to traffic and will meet the requirements of the June 8, 1993 memorandum. It was determined after the 1992 mechanical inspection of the Third Lake Bridge (90/25N) that mechanical inspections on both of the I-90 floating bridges are not needed due to their lack of mechanical components.

When in-depth mechanical/electrical inspections performed by consultants coincide with the random mechanical/electrical inspections, we will use the in-depth inspections in place of the random inspections. This occurs on the Hood Canal Bridge in 1994 and is denoted on the schedule by an asterisk.

With your approval, we would like to adopt the inspection schedule shown below which allows us to conduct 1 mechanical and 2 electrical inspections per year, rather than 2 mechanical and 4 electrical inspections every other year.

RECEIVED

MAY 12 1994

DEPT. OF TRANSPORTATION
BRIDGE & STRUCTURES

DOT 700-008X
Revised 6/92

M. Myint Lwin
May 10, 1994
Page 2

Inspection Schedule

<u>Bridge No.</u>	<u>* Water-Tightness</u>	<u>Electrical</u>	<u>Mechanical</u>
90/25S	Annually	1995, 1997, ...	NA**
90/25N	Annually	1994, 1996, ...	NA**
104/5.1 & 5.2	Annually	1994*, 1996, ...	1994*, 1996, ...
520/8	Annually	1995, 1997, ...	1995, 1997, ...

* In-depth electrical/mechanical inspections by consultants

** Random mechanical inspections not needed, as determined after the 1992 random mechanical inspection on 90/25S.

ORG:jj
MPP/DLS
Attachment

** Shall include inspection/testing of sensors
piping system and pumps.*

Approval: *M. Myint Lwin*
M. MYINT LWIN, P.E.
Bridge and Structures Engineer

Date: 5-28-94



Washington State
Department of Transportation

Memorandum

Date: June 8, 1993
From: A. H. Waller
J. F. Conrad
Thru: E. R. Burch
J. R. Buss
To: S. A. Moon

Subject: Floating Bridge
Random Inspections

As directed by the Transportation Commission, random inspections have been conducted on the three state floating bridges. Based on our office's evaluation of the initial inspections, we request your approval of the following proposals on the process to be used in the future:

1. Responsibility for planning and conducting the random inspections should be delegated to the Bridge Office, and clearly defined in Directive D23-11.
2. A report on findings on each inspection should be prepared by the Bridge Office and sent to the Chief Maintenance Engineer for further transmittals to the districts.
3. Annual random inspections should be conducted to verify water-tightness of the bridge pontoons.

Random inspections focusing on reliability of mechanical and electrical systems of the bridges should be conducted at two year intervals.

The following background is provided to assist in your consideration of the above proposals:

The Report issued on May 2, 1991 by the Blue Ribbon Panel investigating the sinking of the Lacey V. Murrow Bridge included a recommendation for "Independent Random Inspections" of the state's floating bridges. ~~These inspections were to be "in addition to the scheduled major inspections" and were to be conducted "by people not responsible for bridge maintenance".~~ Emphasis of the inspections was to be "placed on the water-tightness of the bridge and on the reliability of electrical and mechanical systems."

S. A. Moon
June 8, 1993
Page 2

Transportation Commission Resolution 398 directed the department to "carefully review, analyze and, if feasible incorporate certain recommendations of the Blue Ribbon Panel". The Resolution's "implementing action document" directs us to address random inspections as follows:

"The Department will hire a consultant or utilize an independent division internal to the Department to provide random inspections on the floating bridges. These inspections ~~are to occur unannounced at least once a year for each bridge and will be an in-depth review of the watertightness of the structure plus an inspection of the mechanical and electrical component of each bridge.~~ A detailed report will be required."

Copies of pertinent sections of the Blue Ribbon Panel Report and Resolution 398 are attached.

An initial random inspection was conducted on the Hood Canal, Evergreen Point and 3rd Lake Floating Bridges in August and September of 1992. The inspection team consisted of members from the Bridge and Structures and Marine Transportation Offices and from the office of the State's mechanical and electrical consultant; the Sverdrup Corporation. Reports on inspection findings were prepared by the Bridge Office and provided to the districts through the HQ Maintenance Office. Inspection recommendations are now being implemented or considered for implementation by the districts.

A post inspection review of the random inspection process by our offices led to the recommendations in this letter. Responsibilities for these inspections need to be clearly defined in a Department Directive. Also, although a one year interval for random inspection of pontoon watertightness appears to be appropriate, ~~a longer interval is needed between random inspections of the electrical and mechanical systems. The longer interval is needed to provide sufficient time to cost-effectively address any problems identified on these complex systems.~~

AHW/JFC:sf
ORG
Attachments

Approval: S. A. Moon
Deputy Secretary of Transportation

Date: 6-22-93

Appendix 8-B Guideline for Writing Electrical and Mechanical Inspection Reports

GUIDELINE FOR WRITING ELECTRICAL AND MECHANICAL INSPECTION REPORTS FOR WSDOT

General - Format and fonts used in the electrical and mechanical inspection reports must be the same. Single side print.

See page 4-8 for a sample cover page.

The cover page of the draft submittal shall have "DRAFT" indicated on top of Washington State Department of Transportation.

The title of the report and the bridge name and bridge number will be indicated exactly as spelled out in the scope of work for the inspection.

A photograph of the general outline of the bridge will appear on the cover of the reports.

The Consultants Company name will appear under the photograph.

The PE Seal shall be placed below the photograph on the Draft but not signed. When the final submittal is ready for the PE Seal it shall be placed on the original report and signed by the Consultant. Color copies will then be made of the original report.

The Table of Contents page shall be page number i. Each page of the report will be numbered sequentially and will agree with the page numbers listed in the Table of Contents. Font size shall be No. 12.

See page 5 of 8 for a sample Table of Contents.

The footers for each report page and appendices shall have the bridge name and number on two lines on the bottom left, the page number in the bottom center and the type of inspection and month and year on two lines on the bottom right. The font shall be No. 10.

The font for the report titles and text shall be No. 12. Heading shall be capitalized and bold.

The report shall include the following sections in the order listed:

The Executive Summary should be brief but give a general assessment of the condition of the bridge systems, major conclusions and a summary of any pertinent recommendations.

The Purpose and Scope of Inspection should state that the purpose of the inspection is to determine the condition of the bridge equipment and identify any deficiencies.

The dates of the inspection and the Consultants Company name should also be indicated. Reference shall be made to the Scope of Work provided by WSDOT in the inspection request for proposal and it shall be attached to the report in Appendix A.

See page 6 of 8 for a sample of the Executive Summary, the Purpose and the Scope of Work.

Any deviations from the Scope of Work should be identified with an explanation of why the deviations occurred.

Inspection Methodology should briefly describe the type of inspections, tests or measurements performed.

A general description of the bridge is not required. We know where the bridge is, what river it crosses and how it operates.

Inspection Findings shall identify the condition of the systems in the order that they are listed in the Scope of Work. All deficiencies shall be identified and reference shall be made to its attached photograph. The photographs shall be the last Appendix in the report except when additional data such as oil sample analysis or other sub-consultant reports are attached. The photos shall be referenced in the body of the report as follows: (See Photo ____ in Appendix ____). Data such as motor currents, insulation resistance, gear tooth measurements, etc. shall be tabulated and included in the Appendices. The tabulated data shall be referenced in the body of the report as follows: (See Table ____ in Appendix ____).

Conclusions shall identify those items which are in need of Emergency Repair, Maintenance Repair or Rehabilitation. Under each of these categories they shall be listed in the order in which they appear in the Scope of Work.

Recommendations shall include Emergency Repairs, Maintenance Repairs or Rehabilitation Recommendations. Emergency Repair recommendations which are not addressed during the inspection shall be made in writing within 48 hours of the finding from the Consultant to the Bridge Preservation Engineer. Recommendations for Maintenance Repairs must be within the capabilities of the available maintenance forces. Rehabilitation recommendations should be made for conditions which will provide 20+ years of extended service.

Cost estimates shall be listed for each rehabilitation recommendation in the order that the system appears in the Scope of Work. (Service Entrance; Power Distribution; Motors and Brakes; Control System; Wire and Conduit; etc.) Do not say Electrical and Mechanical Rehabilitation and give a lump sum figure. Beneath the cost estimate a note shall indicate that cost estimates are for material and installation labor (bridge items only). They do not include cost for design engineering, maintenance, traffic control, construction management or administration.

Appendices shall be made attached in the following order:

Appendix A – Scope of Work

Appendix B – Condensed Mech/Elect Rating Summary

B1 Numerical Rating Condition Description (WSDOT provided with Scope of Work)

B2 Condensed Mech/Elect Rating Summary

C, D, etc – tabulated data, schematics, tables of measurements etc.

The last Appendix should be photographs unless there are Co-Consultant documents like oil analysis in which case the photographs are the next to last and the Co-Consultant data is last. There shall be two photographs on each page.

Appendices shall have a cover page with a Table of Contents.

See page 7 of 8 for a sample Appendix Table of Contents

Appendices sheets shall have the same footer as the report but the page number will be prefaced with the letter of the Appendix

Data sheets and measurements sheets shall be arranged in the order that the subject appears in the Scope of Work.

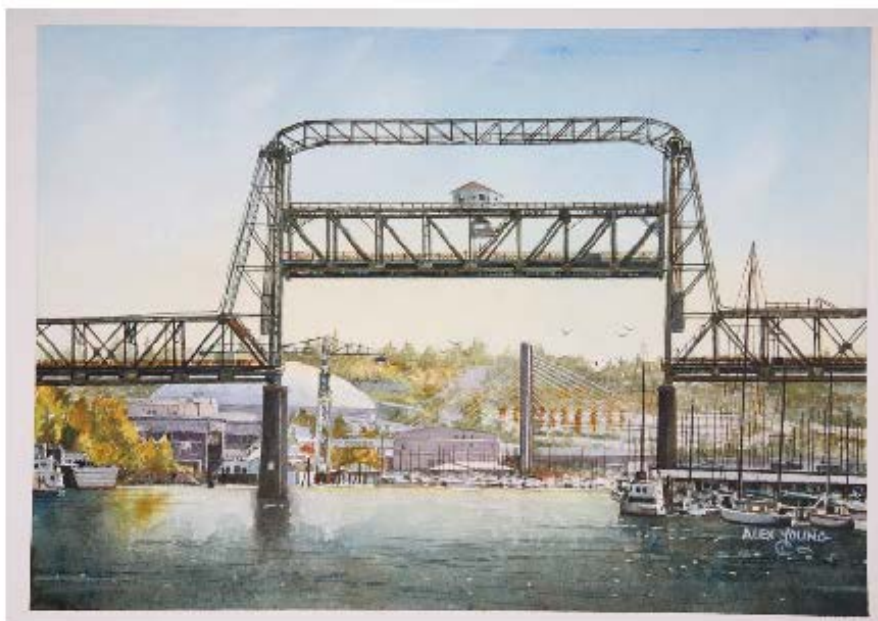
See page 8 of 8 for a sample photograph page.

All reports are to be comb bound with clear plastic covers. The final submittal shall consist of one bound final report with original photographs which shall be stamped and signed by an Engineer of the appropriate discipline licensed in the State of Washington and six color copies of the report. An electronic copy of the final report in PDF format and an electronic copy of all photographs in jpeg format shall be submitted with the final reports.

**WASHINGTON STATE
DEPARTMENT OF TRANSPORTATION**

**(TYPE) INSPECTION REPORT
MONTH, YEAR**

**NAME OF BRIDGE
BRIDGE NO. (W/XYZ)**



**PREPARED BY
FIRM NAME
CITY, STATE**



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Name of Bridge
Bridge No.

i

Type of Inspection
Month, Year

EXECUTIVE SUMMARY

This report documents the condition of the Bridge Name and Bridge Number, electrical (or mechanical) systems. Overall, the bridge operated in an acceptable manner during the inspection. There were no emergency repairs required at this time. Items which required maintenance have been identified in the recommendations. Items requiring rehabilitation include the following: (Do not just copy the repair list or the rehabilitation recommendation list. Write a summary.)

PURPOSE AND SCOPE OF INSPECTION

The purpose of this report is to document the condition of the Bridge Name and Number on which an In-Depth Electrical (or Mechanical) inspection was performed on (Date). The Scope of Work for this inspection is attached as Appendix 1.

Name of Bridge
Bridge No.

1

Type of Inspection
Month, Year

6-8

wirgrev7

APPENDIX D
PHOTOGRAPHS

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Photo 3	Photo Title.....	D2
Photo 4	Photo Title.....	D2
Photo 5	Photo Title.....	D3

Name of Bridge
Bridge No.

Di

Type of Inspection
Month, Year



Photo 1 Control Desk



Photo 2 Broken conduit fitting on NE Thruster Brake

Name of Bridge
Bridge No.

D1

Type of Inspection
Month, Year

8-8

wirgrev7

Appendix 8-C Numerical Rating Condition Description

NUMERICAL RATING CONDITION DESCRIPTION	
Rating Condition	Description of Condition
1	FAILED CONDITION. Item not operational.
2	POTENTIALLY HAZARDOUS. Deterioration or damage to span drive or stabilizing machinery which could cause movable span to become imminently unstable in any position. Malfunction or deterioration of electrical system which could cause loss of control of the moving span. Deficiency in electrical system design, maintenance, or operational procedure which could cause loss of control of moving span. Inoperable vehicular traffic control device. Also, extreme cases of defects listed under higher rating numbers. Bridge may not be opened to marine traffic. If problem is with stabilizing machinery in the closed position, temporary shoring or support may be necessary to permit safe vehicular traffic over the closed bridge at reduced speed or rating. However, if problem, is with counterweight components of vertical lift bridge stabilizing machinery, bridge may be closed to all traffic until shored or repaired.
3	VERY SERIOUS DETERIORATION. Deterioration or damage to machinery which will not cause imminent instability of a non-redundant span drive but reduces allowable load on drive and may cause future instability if not corrected. Stabilizing machinery damaged, deteriorated, or improperly operated such that movable structure is not properly supported causing structure not to behave as designed and resulting in structural overstress and movements under vehicular traffic that severely affect quality. Severe misalignment of stabilizing machinery, resulting in overload of electrical system and consequent overstress of span drive machinery. Severe interference between moving span and fixed structure due to substructure movements. Deterioration of electrical control system such that many of the safety interlocks are normally bypassed, inconsistent control of moving span, and inoperable or missing traffic control devices. Operation of movable span may be restricted in terms of opening angle, number of openings, and allowable wind velocity. If problem is with stabilizing machinery, shoring may be necessary to permit vehicular traffic.
4	SERIOUS DETERIORATION. Severe wear, deterioration or damage to span drive or stabilizing machinery due to overloading, inadequate maintenance, improper operation, or movement of the structure or substructure. Electrical system malfunctions and numerous safety interlocks are by-passed. Results are inconsistent, noisy, and unreliable operation of the movable span. Improper closure, affecting structural action and vehicular ride quality. Electrical system has archaic components for which replacements are no longer available and open bus panelboards that are considered unsafe nowadays.
5	MODERATE DETERIORATION. Excessive wear, some damage and deterioration of span drive and stabilizing mechanical machinery. Repairs and replacement of some machinery components required. Bearings may need liner adjustment. Machinery may be misaligned due to shifting of structure and substructure but not enough to seriously overload span drive: correctable by adjusting machinery component location using shims, etc. Replacement of corroded machinery fasteners required. Moving span under control but some indicating and safety devices may be inoperable and may be by-passed, and span limit switch may need adjustment.
6	MINOR DETERIORATION. None of the major mechanical machinery components are worn or damaged to the extent that replacement is now required. Some components of the span drive may need to be replaced, such as flex-couplings grids, brake linings, etc. Span stabilizing machinery functioning except that wear may have caused excessive clearances in lock bar guides, etc. Shimming of lock bar guides, replacement of limit switches and adjustments necessary. Machinery needs cleaning, painting, lubrication and adjustment. Electrical system generally functioning as designed. Replacement of some relays, indicating devices and lights may be required. Traffic control devices need repair or maintenance.
7	ALMOST NEW CONDITION. No extensive repairs required. Machinery needs cleaning, painting, lubrication, and adjustment. Electrical systems functioning as designed; may need replacement of indicating lights and minor limit switch adjustment, cleaning of relay contacts and housekeeping in panelboard. Traffic control devices functioning but may need replacement of obstruction lights, object markers, painting of housings, lubrication and adjustment of limit switches.
8	NEW CONDITION. Virtually no repairs required. Mechanical machinery may need cleaning, touch-up painting and lubrication. Electrical system and traffic devices functioning but may need replacement of bulbs and minor housekeeping.
9	NOT APPLICABLE. This device or equipment is not on the structure being inspected.
N/I	NOT INSPECTED. This device or equipment was not included in the inspection.

Appendix 8-D Continued Certification of Complex Bridge Inspection Personnel

A continued certification of complex bridge and tunnel inspection personnel has been established to ensure that all program managers and inspectors are kept up to date with the latest practices and technology in the areas of bridge and tunnel inspections. This continued certification program requires that each Electrical/Mechanical Complex Bridge Lead Inspector (CBLI) and their Delegated Program Manager(DPM) must participate in the following during a five-year period to maintain certification:

- 30 hours of bridge related continuing education courses and training including WSDOT sponsored bridge training, bridge conferences and other NHI bridge training courses as approved by the delegated program manager.

Continued Certification Course and Training List

The following is a list of courses that are examples of what would qualify in combination to acquire 30 hours of continuing education hours in the designated five-year period. It is the inspector's responsibility to ensure that the information is given to their manager within the necessary timeframes to ensure continued certification.

National Electric Code	16 hours
Grounding and Bonding Training	16 hours
NFPA 70E Arc Flash Electrical Safety	16 hours
Programmable Logic Controller Training	24 hours
AC/DC Motors and Drives Training	16 hours
Cathodic Protection	40 hours
National Fire Alarm and Signaling Code	24 hours
Non-Destructive Testing Training	24 hours
Hydraulics & System Troubleshooting	16 hours
Principles of Bearings and Lubrication	16 hours
Coupling and Shaft Alignment	16 hours
Strain Gage Workshop	40 hours
Pacific NW Bridge Maintenance Conference	16 hours
Pacific NW Bridge Inspection Conference	16 hours
Heavy Movable Structures Conference	16 hours
Western Bridge Engineers' Seminar	16 hours
WSDOT/LTAP – Bridge Condition Inspection Training (BCIT)	72 hours
WSDOT/LTAP – Bridge Condition Inspection Update (BCIU)	16 hours

Appendix 8-E Complex Bridge and Tunnel Inspection List

The following is a list of complex bridges and tunnels that require electrical and mechanical inspections in accordance with the NBIS and NTIS. The regularly scheduled inspections for each structure are listed along with their frequency. Special inspections in addition to those listed may be conducted if deemed necessary.

12/12N – Wishkah River Bridge

Electrical

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)

Mechanical

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)

12/12S – Heron Street Bridge

Electrical

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)

Mechanical

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)

12/915 – Snake River Clarkston

Electrical

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)

Mechanical

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)
Counterweight Rope Inspection (6 yrs)
Trunnion Bearing Inspection (6 yrs)

16/110E – Tacoma Narrows

Electrical

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)

Mechanical

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)

16/110W – Tacoma Narrows

Electrical

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)

Mechanical

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)

90/25N – Homer M. Hadley

Electrical

Routine Inspection (1 yr)
Blue Ribbon Inspection (2 yrs)
Blue Ribbon Cathodic Protection Inspection (2 yrs)
In-Depth Inspection (6 yrs)
In-Depth Cathodic Protection Inspection (6 yrs)

90/25S – Lacey V. Murrow

Electrical

Routine Inspection (1 yr)
Blue Ribbon Inspection (2 yrs)
Blue Ribbon Cathodic Protection Inspection (2 yrs)
In-Depth Inspection (6 yrs)
In-Depth Cathodic Protection Inspection (6 yrs)

99/530E – Duwamish River Br**Electrical**

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)

Mechanical

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)
Trunnion Bearing Inspection (6 yrs)

99/530W – Duwamish River Br**Electrical**

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)

Mechanical

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)

101/115 – Chehalis River Bridge**Electrical**

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)

Mechanical

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)

101/125E – Hoquiam River - Riverside**Electrical**

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)

Mechanical

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)
Counterweight Rope Inspection (6 yrs)

101/125W – Hoquiam River - Simpson**Electrical**

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)

Mechanical

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)

104/5.1 – Hood Canal-W.A. Bugge Bridge W**Electrical**

Routine Inspection (1 yr)
Blue Ribbon Inspection (2 yrs)
Blue Ribbon CP Inspection (2 yrs)
In-Depth Inspection (6 yrs)
In-Depth CP Inspection (6 yrs)

Mechanical

Routine Inspection (1 yr)
Blue Ribbon Inspection (2 yrs)
In-Depth Inspection (6 yrs)

104/5.2 – Hood Canal-W.A. Bugge Br E**Electrical**

Routine Inspection (1 yr)
Blue Ribbon Inspection (2 yrs)
Blue Ribbon CP Inspection (2 yrs)
In-Depth Inspection (6 yrs)
In-Depth CP Inspection (6 yrs)

Mechanical

Routine Inspection (1 yr)
Blue Ribbon Inspection (2 yrs)
In-Depth Inspection (6 yrs)

513/12 – Montlake Bridge**Electrical**

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)

Mechanical

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)

520/8 – Albert D. Rosellini Bridge**Electrical**

Routine Inspection (1 yr)
Blue Ribbon Inspection (2 yrs)
In-Depth Inspection (6 yrs)

Mechanical

Routine Inspection (1 yr)
Blue Ribbon Inspection (2 yrs)
In-Depth Inspection (6 yrs)

529/10E – Snohomish River Bridge**Electrical**

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)

Mechanical

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)
Counterweight Rope Inspection (6 yrs)

529/10W – Snohomish River Bridge**Electrical**

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)

Mechanical

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)
Counterweight Rope Inspection (6 yrs)

529/20E – Steamboat Slough**Electrical**

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)

Mechanical

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)

529/20W – Steamboat Slough**Electrical**

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)

Mechanical

Routine Inspection (1 yr)
In-Depth Inspection (6 yrs)

90/22LID – Martin Luther King LID**Electrical**

Routine Inspection (2 yr)
In-Depth Inspection (6 yrs)

Mechanical

Routine Inspection (2 yr)
In-Depth Inspection (6 yrs)

90/24N – Mt Baker Ridge Tunnel**Electrical**

Routine Inspection (2 yr)
In-Depth Inspection (6 yrs)

Mechanical

Routine Inspection (2 yr)
In-Depth Inspection (6 yrs)

90/24S – Mt Baker Ridge Tunnel**Electrical**

Routine Inspection (2 yr)
In-Depth Inspection (6 yrs)

Mechanical

Routine Inspection (2 yr)
In-Depth Inspection (6 yrs)

90/26LID – First Hill LID**Electrical**

Routine Inspection (2 yr)
In-Depth Inspection (6 yrs)

Mechanical

Routine Inspection (2 yr)
In-Depth Inspection (6 yrs)

5/549CNC – Wash St Convention Center**Electrical**

Routine Inspection (2 yr)

In-Depth Inspection (6 yrs)

Mechanical

Routine Inspection (2 yr)

In-Depth Inspection (6 yrs)

304/9 – Bremerton Tunnel**Electrical**

Routine Inspection (2 yr)

In-Depth Inspection (6 yrs)

Mechanical

Routine Inspection (2 yr)

In-Depth Inspection (6 yrs)

Appendix 8-F **Operations, Inspections, and Maintenance Manual List**

The following is a tabulated listing of all of the OIM manuals generated by the BPO. They are updated as necessary when rehabilitations of bridge systems occur or major components are changed.

Bridge #	Bridge Name	Manual Date	Revision Date	Document Number
12/12N	Wishkah River	Jun-03	2006	M 23-25
12/12S	Wishkah River - Heron	Jun-03	2007	M 23-19
12/915	Snake River - Clarkston	Jun-96	Dec-04	M 23-26
16/110E	Tacoma Narrows	Jun-95		*
90/25N	Homer M. Hadley	Jul-06		*
90/25S	Lacey V. Murrow	Jul-06		*
99/530E	Duwamish River	Jun-01		M 23-31
99/530W	Duwamish River	Jun-01	2007	*
101/115	Chehalis River	Oct-99	Aug-05	M 23-23
101/125E	Hoquiam River - Riverside	Jun-97		M 23-22
101/125W	Hoquiam River - Simpson	Sep-79		M 23-33
104/5.1 & 5.2	Hood Canal	Jun-96		M 23-12
513/12	Montlake Bridge	Nov-02		M 23-30
520/8	Evergreen Point	Apr-04		M 23-13
529/10E & W	Snohomish River	Mar-01		M 23-21
529/20E & W	Steamboat Slough	Jan-05		M 23-28

*Document number not yet assigned.

9-1 General

The National Tunnel Inspection Standards (NTIS) are published in the Code of Federal Regulations, 23 CFR 650, Subpart E. The NTIS requires that tunnel owners establish a program for the inspection of highway tunnels, to maintain a tunnel inventory, to report the inspection findings to FHWA, and to correct any critical findings found during these inspections. The Washington State's tunnel inspection program functions fully within the umbrella of the Washington State's bridge inspection organization.

Washington State's tunnel inspection organization, however, is only responsible for state and local agency-owned tunnels. Federally-owned tunnels are inventoried, inspected, and managed by federal agencies. Privately-owned highway tunnels are not included in this requirement, although WSDOT encourages private tunnel owners to inspect and maintain their tunnels in conformance with the NTIS and this manual. There is an open invitation for private tunnel owners to submit bridge records to the Washington State Bridge Inventory System (WSBIS).

9-1.1 Definitions

Complex Tunnel – A tunnel characterized by advanced or unique structural elements or functional systems.

Highway LID – A structure built with green space which interconnects neighborhoods otherwise cut off or impacted by freeways, with or without local roads. If carrying local roads, the structure must have a deck area at least twice the area of the roads it carries. Highway "LIDS" shall be inventoried as tunnels under the NTIS.

National Tunnel Inspection Standards (NTIS) – Title 23 Code of Federal Regulations 650 Subpart E defines the NTIS regulations, and establishes requirements for inspection procedures, frequency of inspections, qualifications of personnel, inspection reports, and preparation and maintenance of a state tunnel inventory. The NTIS apply to all structures defined as highway tunnels located on all public roads.

Tunnel – The term "tunnel" means an enclosed roadway for motor vehicle traffic with vehicle access limited to portals, regardless of type of structure or method of construction, that requires, based on the owner's determination, special design considerations that may include lighting, ventilation, fire protection systems, and emergency egress capacity. The term "tunnel" does not include bridges or culverts inspected under the National Bridge Inspection Standards (Title 23 Code of Federal Regulations 650 Subpart C). The state of Washington shall prepare and maintain an inventory of all tunnels subject to the NTIS.

Specifications for the National Tunnel Inventory (SNTI) – The SNTI is intended to supplement the NTIS and provide the specifications for coding data required to be submitted to the National Tunnel Inventory (NTI). Data in the NTI will be used to meet legislative reporting requirements and provide tunnel owners, the Federal Highway Administration (FHWA) and the general public with information on the number and condition of the Nation's tunnels.

National Tunnel Inventory (NTI) – The aggregation of structure inventory and appraisal data collected to fulfill the requirements of the National Tunnel Inspection Standards.

Tunnel Operations, Maintenance, Inspection, and Evaluation Manual (TOMIE) – The TOMIE provides uniform and consistent guidance on the operation, maintenance, inspection, and evaluation of tunnels.

See Section 1-1.1 for additional definitions used in this manual.

9-2 Description of Tunnel Inspection Organization

In accordance with the description of the Bridge Inspection Organization offered in Section 1-2, a tunnel inspection organization as required by the NTIS has been developed. The tunnel inspection organization functions completely under the umbrella of the Washington State bridge inspection organization. The makeup of the tunnel organization is identical in all aspects as the bridge inspection organization.

9-3 Tunnel Inspection Programs

In accordance with the description of the Bridge Inspection Programs offered in Section 1-3, a tunnel inspection program as required by the NTIS has been developed. The tunnel inspection program functions completely under the umbrella of the Washington State bridge inspection organization. The makeup of the tunnel inspection program is identical in all aspects as the bridge inspection program.

9-4 Tunnel Inspection Organization Roles and Responsibilities

In accordance with the description of the Bridge Inspection Organization Roles and Responsibilities offered in Section 1-4, tunnel inspection Organization Roles and Responsibilities as required by the NTIS has been developed. Tunnel inspection roles and responsibilities fall completely under the umbrella of the Washington State bridge inspection organization with the additional requirement for the Team Leader as described below.

9-4.1 Team Leader (TL)

A team leader is in charge of an inspection team and responsible for planning, preparing, and performing the field inspection of tunnels. The team leader also makes repair recommendations and is responsible for initiating the critical damage procedures including full tunnel closure if deemed necessary. To qualify as a team leader, the individual must meet, at a minimum, the team leader requirements as described in the NTIS. Team leaders must be recertified on a regular basis by attending a refresher training class according to state policy. The certification process is described in detail in Section 1-5.

9-5 Tunnel Inspection Certification

Certification for tunnel inspection work within the state of Washington is in accordance with the requirements described in Section 1-5 with the additional requirement of having a Certificate of completion of an FHWA approved comprehensive tunnel inspection course such as the NHI Tunnel Safety Inspection course. All certified NTI inspector numbers will be tracked through the Bridgeworks System.

9-6 Tunnel Inspection Certification Probation, Suspension, Decertification and Reinstatement

A process for decertification has been established to ensure that all PM's and TL's are following the proper conduct of their respective positions. The requirements for Tunnel inspectors is identical to that of Bridge Inspectors as described in Section 1-6.

9-7 Inspections

A multi-disciplined approach to tunnel inspection has been adopted by the WSDOT Bridge Preservation Office to comply with the requirements of the NTIS. Routine inspections for the Civil and Structural components are described in Chapter 3 while the Electrical and Mechanical inspection are described in Chapter 8.

9-8 Tunnel Elements

BMS elements for WSDOT Tunnels is listed in Appendix 9-A (Only Civil/Structural Elements)

*There is no translation from WSDOT condition state to the SNTI.

WSDOT Pre-NTIS tunnel elements 250, 251, 252, 253 are discontinued and replaced with the Specifications for the National Tunnel Inventory (SNTI) elements. WSDOT bridge elements previously included in tunnel inspections no longer apply to tunnels.

This section describes why modified tunnel condition states are used by WSDOT to manage and inspect the tunnels. Element names and numbers are the same as published in the Specifications for the National Tunnel Inventory (SNTI), with WSDOT minor clarifications to the descriptions. However, the condition state definitions have been modified to follow the management and inspection philosophies of the WSDOT Bridge Elements as described here, see Section 4-1.3.A for the use of the word "Affected" in evaluating condition states. There are no clarifications or changes to the Tunnel Inventory items.

The WSDOT deviation in condition evaluation can be summarized by stating the Condition State 2 (CS2) is reserved to document the quantity of repairs only, and excludes minor deteriorations that are not significant to management or the condition evaluation. The SNTI sets the precedent to evaluate repairs as a condition state 2 and has several examples specified, such as: Patching, Sound Patching, Arrested Cracks, Doubling Plates or similar, and other "Mitigated Defects". By including conditions other than repairs, the SNTI evaluation is more difficult and dilutes the quality of data for management purposes. This WSDOT CS2 deviation from SNTI is small, but has a large impact to the inspector and a significant improvement to the asset management.

The SNTI condition states require the inspector to make three evaluations to determine the proper condition state; typically, "Is the field condition CS2? or CS3?, or CS4? This requires significant memorization of the element definitions to consistently and correctly evaluate a variety of material defects, and extrapolate for defects not specified. By documenting only repair quantities in CS2, the inspector evaluation is essentially reduced to, "Is the defect CS3 or CS4?" The evaluation is focused on the important field conditions and the most valuable to management where the following significant benefits and efficiencies are realized.

1. The coding is simplified since repairs are easily identified and quantified. This improves the consistency between inspectors and is quality improvement because CS3 and CS4 is the focus of the inspection effort which provides the most useful data to predict future conditions and budgeting need. The focus is on, "What needs to be inspected and documented?"
2. More efficient in two ways. The first saves time because a large number of CS2 minor structural defects are ignored, such as: Freckled rust, Discoloration, Beginning Decay, and Hairline cracks. This data and documentation is not useful for prediction of element deterioration and does not justify the attention of funding. The second efficiency is a small number defects specified in SNTI as CS2 may be evaluated as WSDOT CS3, such as "Loose Fasteners in a Steel Tunnel Liner" because a repair may be appropriate. This useful information is more appropriate to WSDOT as CS3.
3. Pre-defined condition states for a few defects can create coding problems and are replaced with a more practical and useful evaluation. For example, the width of a concrete crack determines the SNTI condition state where large cracks are CS4. This prescriptive coding assumes a small crack is not a problem which may not be the case in the field. WSDOT condition state 3 and 4 is based on the importance of the crack using engineering judgment and practice, where the crack width is a factor. This allows a structurally significant small crack to be CS3 OR CS4 and a large crack $\frac{1}{4}$ " wide in a sidewalk/barrier could be CS1. This WSDOT philosophy solves the coding problem for all materials including pre-cracked timber and concrete.
4. Repair quantities exclusively in CS2 provide the benefit of indirectly tracking a long term cost and decline of the asset. As the quantities change with time, CS1 quantities move to 3 or 4 and collect as expensive CS2 repairs. The SNTI definition eventually leads to a problem on older elements when the history of repairs is mixed with minor element defects because two possible conditions can exist with a large amount of CS2. Either an element is aging gracefully or the element has frequently been in Poor condition with a large amount of repairs; or some combination thereof. These are two different and distinct scenarios that cannot be distinguished in SNTI data for modeling or funding. By having exclusive CS2 repair quantities, WSDOT can model both scenarios. In addition, the CS2 quantities are an indicator of element performance and better of support the decision of when to replace the element in the inventory.
5. The WSDOT tunnel conditions tie directly to an NBI reporting of Good, Fair, and Poor which are directly associated with the established "Structurally Deficient" rating for bridges. Primary tunnel elements with quantities in CS3 are considered by WSDOT as Fair condition, and tunnels with quantities in CS4 are in Poor condition. If FHWA establishes an equivalent rating system for tunnels or WSDOT includes tunnels in reporting processes, the WSDOT elements have a justifiable reporting system.

The SNTI use of the word "Severe" to describe CS4 has proven confusing to the WSDOT inspection and reporting process. Severe structural defects are viewed as something that demands an immediate or emergency action and inappropriate for a management system which takes up to 10 years or more to respond with funding.

There are two important goals behind any asset management system. One goal is to identify what may require funding in the future and the second goal is to identify what needs funding now. With repairs dedicated to CS2, WSDOT definitions directly support these two goals with field conditions in state 3 may require funding, but not at this time; and field conditions in state 4 require funding for repair, rehabilitation, or replacement of the element, but are still safe for public use. If CS2 is used to collect other field conditions, the two goals of asset management are diminished and with little benefit.

6. Lastly, WSDOT believes modified CS2 is technically within the intent of the SNTI CS2 since repairs are clearly specified for several SNTI elements. Therefore, the FHWA element reporting will reflect the data as coded by the WSDOT inspector.

9-9 Tunnel QC/QA Program

In accordance with the description of the WSDOT Bridge Preservation Office Quality Control Program offered in Section 7-2, a tunnel QC program as required by the NTIS has been developed. The tunnel inspection program functions completely under the umbrella of the Washington State bridge inspection organization. The makeup of the tunnel QC program is identical in all aspects as the bridge inspection QC program except for Mechanical and Electrical QC, which is developed and documented in Section 8-4.

9-10 Tunnel Records

9-10.1 SNTI Coding Guide

In accordance with the description of the WSDOT Bridge Preservation Office Bridge Files and Documentation offered in Section 2-1, Tunnel Files and Documentation as required by the NTIS has been developed. Tunnel Files and Documentation functions completely under the umbrella of the Washington State bridge inspection organization.

The SNTI Coding Guide Section 2 Inventory data has been incorporated into the WSBIS Coding Guide, available in Appendix 2-C. A summary of the SNTI codes with associated WSBIS codes are in Appendix 9-C.

9-11 Appendices

Appendix 9-A	Civil/Structural Tunnel BMS Elements
Appendix 9-B	WSDOT Tunnel Listing
Appendix 9-C	WSBIS / NTI Tunnel Inventory Codes

Appendix 9-A Tunnel BMS Elements

Civil/Structural Tunnel BMS Element Listing

Element Type	Element Number	Element Description	Unit	Page
Liners	10000	Steel Tunnel Liner	SF	9-A-1
	10001	Cast-In-Place Tunnel Liner	SF	9-A-3
	10002	Precast Concrete Tunnel Liner	SF	9-A-3
	10003	Shotcrete Tunnel Liner	SF	9-A-3
	10004	Timber Tunnel Liner	SF	9-A-3
	10005	Masonry Tunnel Liner	SF	9-A-4
	10006	Unlined Rock Tunnel	SF	9-A-4
	10007	Rock Bolt/Dowel	EA	9-A-4
	10009	Other Tunnel Liner	SF	9-A-5
Tunnel Roof Girders	10010	Steel Tunnel Roof Girders	LF	9-A-5
	10011	Concrete Tunnel Roof Girders	LF	9-A-5
	10012	Prestressed Concrete Tunnel Roof Girders	LF	9-A-5
	10019	Other Tunnel Roof Girders	LF	9-A-5
Columns / Piles	10020	Steel Column / Piles	EA	9-A-6
	10021	Concrete Column / Piles	EA	9-A-6
	10029	Other Column / Piles	EA	9-A-6
Cross Passageway	10030	Steel Cross Passageway	LF	9-A-6
	10031	Concrete Cross Passageway	LF	9-A-6
	10033	Shotcrete Cross Passageway	LF	9-A-6
	10034	Timber Cross Passageway	LF	9-A-6
	10035	Masonry Cross Passageway	LF	9-A-6
	10036	Unlined Rock Cross Passageway	LF	9-A-6
	10039	Other Cross Passageway	LF	9-A-6
Interior Walls	10041	Concrete Interior Walls	SF	9-A-7
	10049	Other Interior Walls	SF	9-A-7
Portals	10051	Concrete Portal	SF	9-A-7
	10055	Masonry Portal	SF	9-A-7
	10059	Other Portal	SF	9-A-7
Ceiling Slab	10061	Concrete Ceiling Slab	SF	9-A-8
	10069	Other Ceiling Slab	SF	9-A-8
Ceiling Girder	10070	Steel Ceiling Girder	LF	9-A-8
	10071	Concrete Ceiling Girder	LF	9-A-8
	10072	Prestressed Concrete Ceiling Girder	LF	9-A-8
	10079	Other Ceiling Girder	LF	9-A-8
Hangers and Anchorages	10080	Steel Hangers and Anchorages	EA	9-A-9
	10089	Other Hangers and Anchorages	EA	9-A-9
Ceiling Panels	10090	Steel Ceiling Panels	SF	9-A-9
	10091	Concrete Ceiling Panels	SF	9-A-9
	10099	Other Ceiling Panels	SF	9-A-9
Invert Slab	10101	Concrete Invert Slab	SF	9-A-10
	10109	Other Invert Slab	SF	9-A-10

Element Type	Element Number	Element Description	Unit	Page
Slab-on-Grade	10111	Concrete Slab-on-Grade	SF	9-A-10
	10119	Other Slab-on-Grade	SF	9-A-10
Invert Girder	10120	Steel Invert Girder	LF	9-A-11
	10121	Concrete Invert Girder	LF	9-A-11
	10122	Prestressed Concrete Invert Girder	LF	9-A-11
	10129	Other Invert Girder	LF	9-A-11
Joints	10130	Strip Seal Expansion Joint	LF	9-A-11
	10131	Pourable Joint Seal	LF	9-A-11
	10132	Compression Joint Seal	LF	9-A-11
	10133	Assembly Joint With Seal	LF	9-A-11
	10134	Open Expansion Joint	LF	9-A-11
	10135	Assembly Joint Without Seal	LF	9-A-11
	10139	Other Joint	LF	9-A-12
Gaskets	10140	Gaskets	LF	9-A-12
Wearing Surface	10151	Concrete Wearing Surface	SF	9-A-13
	10158	Asphalt Wearing Surface	SF	9-A-13
	10159	Other Wearing Surface	SF	9-A-13
Traffic Barrier Pedestrian Railing	10160	Steel Traffic Barrier	LF	9-A-14
	10161	Concrete Traffic Barrier	LF	9-A-14
	10169	Other Traffic Barrier	LF	9-A-14
	10170	Steel Pedestrian Railing	LF	9-A-14
	10171	Concrete Pedestrian Railing	LF	9-A-14
	10179	Other Pedestrian Railing	LF	9-A-14
Lighting Fixtures	10601	Tunnel Lighting Fixtures	EA	9-A-15
Protective Systems	10952	Fire Protective Coating	SF	9-A-15
	10955	Reflective Tunnel Tile	SF	9-A-16

Tunnel liner quantities are based on the shape of the liner perimeter which does not include the roadway because the roadway/slab elements document these conditions. The total quantity for circular tunnel shape has a circular perimeter multiplied by the length of tunnel. The total quantity for a horseshoe tunnel is the perimeter exposed to traffic minus the roadway surface multiplied by the length of tunnel.

10000	Steel Tunnel Liner	Units – SF
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Record this element for all steel tunnel liners. Steel tunnel liners function as a shell for the exterior of the tunnel and as a divider between different bores of the tunnel.

The area of a tunnel liner is the product of the length (along the centerline) of the tunnel and the perimeter of the liner.

10001	Cast-in-Place Concrete Tunnel Liner	Units – SF
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Record this element for all cast-in-place concrete tunnel liners. Cast-in place concrete tunnel liners function as a shell for the exterior of the tunnel and as a divider between different bores of the tunnel.

The area of a tunnel liner is the product of the length (along the centerline) of the tunnel and the perimeter of the liner.

10002	Precast Concrete Tunnel Liner	Units – SF
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Record this element for all precast concrete tunnel liners. Precast concrete tunnel liners function as a shell for the exterior of the tunnel and as a divider between different bores of the tunnel.

The area of a tunnel liner is the product of the length (along the centerline) of the tunnel and the perimeter of the liner.

10003	Shotcrete Tunnel Liner	Units – SF
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Record this element for all shotcrete tunnel liners. Shotcrete tunnel liners function as a shell for the exterior of the tunnel and as a divider between different bores of the tunnel.

The area of a tunnel liner is the product of the length (along the centerline) of the tunnel and the perimeter of the liner.

10004	Timber Tunnel Liner	Units – SF
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Record this element for all timber tunnel liners consisting of timber sets with or without timber lagging. Timber tunnel liners function as a shell for the exterior of the tunnel and as a divider between different bores of the tunnel.

The area of a tunnel liner is the product of the length (along the centerline) of the tunnel and the perimeter of the liner.

10005	Masonry Tunnel Liner	Units – SF
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Record this element for all masonry tunnel liners. Masonry tunnel liners function as a shell for the exterior of the tunnel and as a divider between different bores of the tunnel.

The area of a tunnel liner is the product of the length (along the centerline) of the tunnel and the perimeter of the liner.

10006	Unlined Rock Tunnel	Units – SF
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Record this element for all unlined rock tunnels. Unlined rock tunnels function as the exterior of the tunnel and as a divider between different bores of the tunnel.

The area of an unlined rock tunnel is the product of the length of the tunnel (along the centerline) and the perimeter of the unlined rock.

Condition States for WSDOT Elements 10000, 10002, 10003, 10004, 10005, and 10006

1. Defects are superficial and have no effect on the structural capacity of the tunnel.
2. Tunnel Liner area with patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Tunnel Liner area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Tunnel area affected by damage in locations or quantity and has reduced the structural capacity of the tunnel (or tunnel liner). Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Defects threaten public safety, or the primary design function of the element.

10007	Rock Bolt/Dowel	Units – EA
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Record this element for all rock bolts or dowels and is not a tunnel liner element. This documents all rock or soil nails used to stabilize the earth in the tunnel, or at and above the portals. Dowels used to connect pieces of precast concrete tunnel liner are considered part of the tunnel liner element and not included in this element.

The total number of rock bolt/dowels is the sum of all the number of rock bolts and dowels.

1. Defects are superficial and have no effect on the structural capacity of the tunnel.
2. Number of bolts with repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Number of bolts with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Number of bolts affected by damage in locations or quantity and has reduced the structural capacity of the element. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Defects threaten public safety, or the primary design function of the element.

10009	Other Tunnel Liner	Units – SF
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Record this element for all tunnel liners composed of other materials. Other tunnel liners function as a shell for the exterior of the tunnel and as a divider between different bores of the tunnel.

The area of a tunnel liner is the product of the length (along the centerline) of the tunnel and the perimeter of the liner.

1. Defects are superficial and have no effect on the structural capacity of the tunnel.
2. Tunnel Liner area with patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Tunnel Liner area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Tunnel area affected by damage in locations or quantity and has reduced the structural capacity of the tunnel (or tunnel liner). Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Defects threaten public safety, or the primary design function of the element.

10010	Steel Tunnel Roof Girders	Units – LF
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10011	Concrete Tunnel Roof Girders	Units – LF
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10012	Prestressed Concrete Tunnel Roof Girders	Units – LF
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10019	Other Tunnel Roof Girders	Units – LF
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Condition States for WSDOT Elements 10010, 10011, 10012, 10019

1. Defects are superficial and have no effect on the structural capacity.
2. Girder length affected by patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Girder length affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Girder span length affected by damage in locations or quantity and has reduced the structural capacity of the element. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Defects threaten public safety, or the primary design function of the element.

Tunnel Column/Piles

10020	Steel Columns/Piles	Units – EA
10021	Concrete Columns/Piles	Units – EA
10029	Other Columns/Piles	Units – EA
<ol style="list-style-type: none"> 1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, efflorescence, and/or superficial cracking, spalls, or delaminations. 2. Number of pile/columns that has been repaired or patched. 3. Number of pile/columns has structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, exposed or corroded reinforcing or strands. 4. Number of pile/columns with damage in locations or quantity and has reduced the structural capacity of the element or the bridge. Structural analysis is warranted 		

Tunnel Passageway

10030	Steel Cross Passageway	Units – LF
10031	Concrete Cross Passageway	Units – LF
10033	Shotcrete Cross Passageway	Units – LF
10034	Timber Cross Passageway	Units – LF
10035	Masonry Cross Passageway	Units – LF
10036	Unlined/Rock Cross Passageway	Units – LF
10039	Other Cross Passageway	Units – LF

Condition States for WSDOT Elements 10030, 10031, 10033, 10034, 10035, 10036, and 10039

1. Defects are superficial and have no effect on the structural capacity.
2. Passageway length affected by patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Passageway length affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Passageway length affected by damage in locations or quantity and has reduced the structural capacity of the element. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Defects threaten public safety, or the primary design function of the element.

Tunnel Interior Walls

10041	Concrete Interior Walls	Units – SF
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10049	Other Interior Walls	Units – SF
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Condition States for WSDOT Elements 10041 and 10049

1. Defects are superficial and have no effect on the structural capacity.
2. Wall Area with patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Wall Area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Wall Area affected by damage in locations or quantity and has reduced the structural capacity of the element. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Defects threaten public safety, or the primary design function of the element.

Tunnel Portal

10051	Concrete Portal	Units – SF
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10055	Masonry Portal	Units – SF
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10059	Other Portal	Units – SF
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Condition States for WSDOT Elements 10051, 10055, and 10059

1. Defects are superficial and have no effect on the structural capacity.
2. Portal Area with patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Portal Area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Portal Area affected by damage in locations or quantity and has reduced the structural capacity of the element. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Defects threaten public safety, or the primary design function of the element.

Tunnel Ceiling Slab

10061	Concrete Ceiling Slab	Units – SF
10069	Other Ceiling Slab	Units – SF

Condition States for WSDOT Elements 10061 and 10069

1. Defects are superficial and have no effect on the structural capacity.
2. Ceiling Slab Area with patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Ceiling Slab Area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Ceiling Slab Area affected by damage in locations or quantity and has reduced the structural capacity of the element. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Defects threaten public safety, or the primary design function of the element.

Tunnel Ceiling Girder

10070	Steel Ceiling Girder	Units – LF
10071	Concrete Ceiling Girder	Units – LF
10072	Prestressed Concrete Ceiling Girder	Units – LF
10079	Other Ceiling Girder	Units – LF

Condition States for WSDOT Elements 10070, 10071, 10072, and 10079

1. Defects are superficial and have no effect on the structural capacity.
2. Ceiling Girder length affected by patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Ceiling Girder length affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Ceiling Girder span length affected by damage in locations or quantity and has reduced the structural capacity of the element. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Defects threaten public safety, or the primary design function of the element.

Tunnel Hangers/Anchors

10080	Steel Hangers and Anchorages	Units – EA
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10089	Other Hangers and Anchorages	Units – EA
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Condition States for WSDOT Elements 10080, and 10089

1. Defects are superficial and have no effect on the structural capacity of the element. There may be discoloration, corrosion, efflorescence, and/or superficial cracking, spalls, or delaminations.
2. Number of Hanger/Anchors that have been repaired or patched.
3. Number of Hanger/Anchors with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs. Structural deficiencies are not limited to delaminations, spalls, structural cracking, corrosion, deformity, exposed or corroded reinforcing or strands.
4. Number of Hanger/Anchors with damage in locations or quantity and has reduced the structural capacity of the element or the supported portion of the structure. Structural analysis is warranted.

Tunnel Ceiling Panels

10090	Steel Ceiling Panels	Units – SF
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10091	Concrete Ceiling Panels	Units – SF
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10099	Other Ceiling Panels	Units – SF
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Condition States for WSDOT Elements 10090, 10091, and 10099

1. Defects are superficial and have no effect on the structural capacity.
2. Ceiling Panel Area with patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Ceiling Panel Area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Ceiling Panel Area affected by damage in locations or quantity and has reduced the structural capacity of the element. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Defects threaten public safety, or the primary design function of the element.

Tunnel Invert Slab

10101	Concrete Invert Slab	Units – SF
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10109	Other Invert Slab	Units – SF
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Condition States for WSDOT Elements 10101 and 10109

1. Defects are superficial and have no effect on the structural capacity.
2. Invert Slab Area with patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Invert Slab Area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Invert Slab Area affected by damage in locations or quantity and has reduced the structural capacity of the element. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Defects threaten public safety, or the primary design function of the element.

Tunnel Slab on Grade

10111	Concrete Slab on Grade	Units – SF
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10119	Other Slab on Grade	Units – SF
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Condition States for WSDOT Elements 10111 and 10119

1. Defects are superficial and have no effect on the structural capacity.
2. Slab On Grade Area with patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Slab On Grade Area with structural defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Slab On Grade Area affected by damage in locations or quantity and has reduced the structural capacity of the element. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Defects threaten public safety, or the primary design function of the element.

Tunnel Invert Girder

10120	Steel Invert Girder	Units – LF
10121	Concrete Invert Girder	Units – LF
10122	Prestressed Concrete Invert Girder	Units – LF
10129	Other Invert Girder	Units – LF

Condition States for WSDOT Elements 10120, 10121, 10122, and 10129

1. Defects are superficial and have no effect on the structural capacity.
2. Invert Girder length affected by patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Invert Girder length affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Invert Girder span length affected by damage in locations or quantity and has reduced the structural capacity of the element. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Defects threaten public safety, or the primary design function of the element.

Tunnel Joints

10130	Tunnel Strip Seal Joint	Units – LF
10131	Tunnel Pourable Joint Seal	Units – LF
10132	Tunnel Compression Seal	Units – LF
10133	Tunnel Assembly Joint w/ Seal	Units – LF
10134	Tunnel Open Expansion Joint	Units – LF
10135	Tunnel Assembly Joint without Seal	Units – LF

10139	Other Tunnel Joint	Units – LF
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Condition States for WSDOT Elements 10130, 10131, 10132, 10133, 10134, and 10135.

These joints use the same philosophy as the 400 series WSDOT Joint elements.

1. The expansion joint is functioning as designed. Joint may not be perfect with signs of leakage. The adjacent slab or header is sound.
2. Skewed joint length at each location with “D” spalls or patches present in the header or in the deck within one foot either side of the joint.
3. Skewed joint length at each location where the deck or headers must be rebuilt to maintain a reliable roadway surface or to maintain seal placement. As a guideline, more than 25 percent of the joint length has spalls or patches in the deck or headers adjacent to the seal.

Steel Materials: Steel components are banging, cracked, loose, broken, or missing. Steel sections that have been removed and/or replaced with something else (usually concrete patching) should be CS3.

10140	Gaskets	Units – LF
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These joints are design to prevent water from penetrating a tunnel liner such as the seal between a segmental tunnel liner. The condition states focus on leakage and other SNTI defects such as header conditions should be ignored.

1. The expansion joint is functioning as designed. Joint may not be perfect, but the joint is not leaking. Seal may be damaged, worn, or cracked. There may be defects in the joint materials holding the seal in place.
2. Skewed joint length at each location with minor leakage or dripping is present. Signs of leakage may be present where leakage may be intermittent or not leaking at the time of inspection.
3. Skewed joint length at each location where water is free flowing; a threat to the tunnel or a tunnel system.

Tunnel Wearing Surface

10151	Concrete Wearing Surface	Units– SF
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This element defines a roadway surface made of Portland Cement Concrete Pavement (PCCP). The condition states do not address faulting, cracking, or smoothness of the profile at this time, but these defects should be described in the element notes. The quantity should equal the overlay's width times the length.

1. Defects are superficial. The concrete surface has no spalls/delaminations or previous repairs.
2. Total area of patches.
3. Total area of spalls or potholes.

10158	Asphalt Wearing Surface	Units– SF
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This element defines a roadway surface made of Asphalt Concrete Pavement (ACP), Hot Mixed Asphalt (HMA), or covered with a Bituminous Surface Treatment (BST) which is also called a Chip Seal. The condition states do not address faulting, cracking, or smoothness of the profile at this time. The quantity should equal the overlay's width times the length.

1. Defects are superficial. The asphalt surface has no spalls/delaminations or previous repairs.
2. Total area of patches.
3. Total area of spalls or potholes.

10159	Other Wearing Surface	Units– SF
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This tunnel element defines a roadway surface, or top layer, that is not asphalt or concrete such as a polyester, epoxy, or cementitious overlay on the roadway. The quantity should equal the overlay's width times the length.

1. Defects are superficial. The asphalt surface has no spalls/delaminations or previous repairs.
2. Total area of patches.
3. Total area of spalls or potholes.

Tunnel Traffic Barrier

10160	Steel Traffic Barrier	Units – LF
10161	Concrete Traffic Barrier	Units – LF
10169	Other Traffic Barrier	Units – LF

Condition States for WSDOT Elements 10160, 10161, and 10169

1. Defects are superficial and have no effect on the structural capacity.
2. Traffic Barrier length affected by patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Traffic Barrier length affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Traffic Barrier length affected by damage in locations or quantity and has reduced the structural capacity of the element. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Defects threaten public safety, or the primary design function of the element.

Tunnel Pedestrian Barrier

10170	Steel Pedestrian Railing	Units – LF
10171	Concrete Pedestrian Railing	Units – LF
10179	Other Pedestrian Railing	Units – LF

Condition States for WSDOT Elements 10170, 10171, and 10179

1. Defects are superficial and have no effect on the structural capacity.
2. Pedestrian Railing length affected by patches, repairs, or other type of mitigation for a CS3 or CS4 defect.
3. Pedestrian Railing length affected by defects. The defects do not significantly affect structural capacity. Deficiencies do not warrant analysis, but may require repairs.
4. Pedestrian Railing length affected by damage in locations or quantity and has reduced the structural capacity of the element. Structural analysis is warranted or has determined repairs are essential to restore the full capacity of the element. Defects threaten public safety, or the primary design function of the element.

Tunnel Mechanical systems (blank)

Tunnel Electrical Systems

10601	Tunnel Lighting Fixtures	Units – EA
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Record this element for all tunnel lighting fixtures. This element includes the physical housing of the tunnel lights and their connections to the support, but does not include the blub. When a lighting fixture serves the dual purpose of general tunnel lighting and emergency tunnel lighting, it is only counted under the tunnel lighting fixture element. However, those fixtures will have an impact on both tunnel lighting system and emergency lighting system elements.

The total quantity for tunnel lighting fixture is the sum of all the tunnel lighting fixtures.

1. Tunnel lighting fixture is fully effective and is functioning as designed. The housing is sealed and protecting the wiring. The anchors are installed and functioning properly.
2. Number of tunnel lighting fixtures that have been repaired.
3. Number of tunnel lighting fixtures with defects. The defects do not significantly affect the ability of the fixture to perform as designed but may require a repair. Weak connections do not threaten public.
4. Number of tunnel lighting fixtures with damage. The defects affect the ability of the fixture to perform as designed but and require repair or replacement. Weak connections threaten the public if they fail.

Fire/Life Safety/Security Systems

10952	Fire Protective Coating	Units – SF
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Record this element for all fire protective coatings used in the tunnel. This element is the coating applied on the tunnel elements to protect these elements from fire.

The total quantity for protective coatings is the product of the length and width of the entire exposed surface of the element.

1. Fire protective coating is fully effective and will function as designed in a fire.
2. Fire protective coating area that has been repaired.
3. Fire protective coating area that is substantially or has limited effectiveness to protect the underlying material in a fire.
4. Fire protective coating area that has exposed the underlying material.

Tunnel Signs (blank)

Tunnel Protective Coatings

10955	Reflective Tunnel Tile	Units - SF
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This element identifies tunnel tile attached to a tunnel liner whether it is reflective or not. The total quantity is the area of tile visible for inspection.

1. Tile is bonded with no cracks, chips, or blemishes. Tile may be dirty but reflectivity is enhanced during regular tunnel washing operations.
2. Tile area that has been repaired.
3. Tile area that is bonded, but cracked and may have efflorescence or small amounts of section loss. Tile may be blemished from impact or other causes resulting in major loss of reflectivity.
4. Tile area with delaminations based on soundings, is completely missing, or has major section loss warranting replacement.

Appendix 9-B WSDOT Tunnel Listing

Structure ID	Bridge Number	Bridge Name	Owner	Facilities Carried	Feature Intersected
0002228A	2/108	TUNNEL	WSDOT	US 2	TUNNEL
0007110L	5/546REN	5TH-EXP TUNNEL	WSDOT	5TH-EXP TUNNEL	I-5
0009839B	5/548PW	S-COL RAMP UNDER PLAZA	WSDOT	W PARK PLAZA	I-5 RAMP
000000PJ	5/549CNC	WASH ST CONVENTION CENTER	WSDOT	CONVENTION CENTER	I-5
0006635D	5/553R	EXPRESS LANES TUNNEL	WSDOT	NB I-5	EXP TUNNEL
0006800E	5/555E-S	E-S RAMP TUNNEL	WSDOT	I-5 REVERSIBLE	E-S RAMP TUNNEL
0006800D	5/555N-W	N-W RAMP TUNNEL	WSDOT	I-5 REVERSIBLE	N-W RAMP TUNNEL
0006470B	5/568S-E	I-5 OVER S-E RAMP TUNNEL	WSDOT	I-5	S-E RAMP TUNNEL
0006304C	5/577E-S	RAVENNA-S RAMP TUNNEL	WSDOT	RAVENNA-S RAMP	I-5
0002138A	12/308	RIMROCK TUNNEL	WSDOT	US 12	RIMROCK TUNNEL
000093CE	14/111	SR 14 TUNNEL UNDER RR	WSDOT	RAILROAD	SR 14
0002051A	14/128	TUNNEL NO 1	WSDOT	SR 14	TUNNEL NO 1
0002051B	14/129	TUNNEL NO 2	WSDOT	SR 14	TUNNEL NO 2
0002051C	14/130	TUNNEL NO 3	WSDOT	SR 14	TUNNEL NO 3
0002042B	14/133	TUNNEL NO 4	WSDOT	SR 14	TUNNEL NO 4
0002042C	14/134	TUNNEL NO 5	WSDOT	SR 14	TUNNEL NO 5
0001735A	14/215	LYLE TUNNEL	WSDOT	SR 14	TUNNEL
0001735B	14/216	TUNNEL NO 7	WSDOT	SR 14	TUNNEL
0006974B	20/316	TUNNEL	WSDOT	SR 20	TUNNEL
0006974D	20/327	TUNNEL	WSDOT	SR 20	TUNNEL
0013190C	90/16S-E	S-E RAMP TUNNEL	WSDOT	I-90	I-90 RAMP
0013105A	90/22LID	MARTIN L KING LID	WSDOT	I-90	MT BAKER RIDGE
0013105B	90/24N	MT BAKER RIDGE TUNNEL	WSDOT	I-90	MT BAKER RIDGE
000000KM	90/24S	MT BAKER RIDGE TUNNEL	WSDOT	I-90	MT BAKER RIDGE TUNNEL
0013199A	90/26LID	FIRST HILL LID	WSDOT	I-90	FIRST HILL
0013666A	90/33E-S	E-S RAMP TUNNEL	WSDOT	I-90	I-90
0013195C	90/33N-W	N-W RAMP TUNNEL	WSDOT	I-90	I-90
0013195D	90/33RE-S	REV E-S RAMP TUNNEL	WSDOT	I-90 EB	RAMP & ISLAND CREST WAY
0013200A	90/35LID	LUTHER BURBANK LID	WSDOT	LANDSCAPED PARK	I-90
0009557A	90/55	SE 35TH ST TUNNEL UNDER I-90	WSDOT	I-90	SE 35TH
0008611C	90/563	PERRY ST TUNNEL UNDER I-90	WSDOT	I-90	S PERRY ST
0002093A	97/359ALT	KNAPPS HILL TUNNEL	WSDOT	US 97ALT	KNAPPS HILL TUNNEL
0004314A	99/541	BATTERY ST TUNNEL	WSDOT	BATTERY STREET	SR 99
0001618A	101/3	FORT COLUMBIA TUNNEL	WSDOT	US 101	FORT COLUMBIA TUNNEL
00200453	101/351	DEER PARK LOOP TUNNEL UNDER US101	WSDOT	US 101	DEER PARK LOOP
0017343A	304/9	BREMERTON TUNNEL	WSDOT	SR 304	FERRY OFFLOAD TUNNEL
0095079A	405/22A	HOUSER WAY TUNNEL	WSDOT	I-405 RAMP & SR900	HOUSER WAY
0008190I	405/35N-W	I-90 OVER N-W RAMP TUNNEL	WSDOT	I-90	I-405 N-W TUNNEL
0008190J	405/35S-E	I-90 OVER S-E RAMP TUNNEL	WSDOT	I-90	I-405 S-E RAMP TUNNEL
0017963C	520/9LID	EVERGREEN POINT ROAD LID	WSDOT	EVERGREEN POINT RD	SR 520
0017963A	520/11LID	84TH AVE NE OVER SR 520	WSDOT	84TH AVE NE	SR 520
0017963H	520/12LID	92ND AVE NE OVER SR 520	WSDOT	92ND AVE NE	SR 520
00200416	520/36.5	NE 36TH ST OVER SR 520	WSDOT	NE 36TH STREET	SR 520

Structure ID	Bridge Number	Bridge Name	Owner	Facilities Carried	Feature Intersected
0006911E	522/15	ROOSEVELT WAY TUNNEL	WSDOT	NE 75TH ST	SR 522
0017945A	525/1S-S	S-E RAMP TUNNEL UNDER S-S RAMP	WSDOT	S-S RP(SR525- I-5)	S-E RAMP (I-5 to SR 524)
0008446B	526/12	SR 526 OVER E-N RAMP TUNNEL	WSDOT	SR 526	E-N RAMP
0014372A	526/22E-N	SR 526 OVER E-N RAMP TUN	WSDOT	SR 526 WB	SR 526 E-N RAMP
08495900	390036896	FISH TRAIL OC THORPE RD	City/Other Park, Forest, or Reservation Agency	PED TRAIL	THORPE RD
08423500	143-S	UPRR UNDERPASS	Railroad	UP RAILROAD	BENGE-WASHTUCNA ROAD
08497700	393083002	BNSF OC WASHINGTON ST	Railroad	BNSFRR	WASHINGTON ST
08531000	393000807	WASHINGTON ST TUNNEL	SPOKANE	RIVERFRONT PARK	WASHINGTON STREET
08580400	200000001	S 188TH ST TUNNEL BR 1	City or Other Toll Authority	AIRPORT RUNWAY	S 188TH ST
08753500	TNL 379	BAIRD SPRINGS TUNNEL	Railroad	BAIRD SPRINGS RD	BNSF RAILROAD
08493400	246001001	BNSF OC THORPE RD	Railroad	BNSFRR	THORPE RD
08210000	SPOK-4451	UPRR OVER MADISON RD	Railroad	UPRR	MADISON ROAD
08216400	D-1	DURGIN ROAD TUNNEL	Railroad	RAILROAD	DURGIN ROAD

Appendix 9-C WSDOT/NTI Tunnel Inventory Codes

WSBIS	NTI Item ID	NTI Inventory Item Name	Comments
1001	I.1	Tunnel Number	
1132	I.2	Tunnel Name	
n/a	I.3	State Code	autogenerated for the NTI submittal
1021	I.4	County Code	
1276	I.5	Place Code	
1274	I.6	Highway Agency District	
1435	I.7	Route Number	
1436	I.8	Route Direction	
1433	I.9	Route Type	
1256	I.10	Facility Carried	
1467	I.11	LRS Route ID	
1469	I.12	LRS Mile Point	
1188	I.13	Tunnel Portal's Latitude	
1196	I.14	Tunnel Portal's Longitude	
n/a	I.15	Border Tunnel State or Country Code	Washington State has no border tunnels, autogenerated for NTI submittal
n/a	I.16	Border Tunnel Financial Responsibility	Washington State has no border tunnels, autogenerated for NTI submittal
n/a	I.17	Border Tunnel Number	Washington State has no border tunnels, autogenerated for NTI submittal
n/a	I.18	Border Tunnel Inspection Responsibility	Washington State has no border tunnels, autogenerated for NTI submittal
1332	A.1	Year Built	
1336	A.2	Year Rehabilitated	
1354	A.3	Total Number of Lanes	
1445	A.4	Average Daily Traffic	
1451	A.5	Average Daily Truck Traffic	
1453	A.6	Year of Average Daily Traffic	
1413	A.7	Detour Length	
1543	A.8	Service in Tunnel	
1019	C.1	Owner	
1286	C.2	Operator	
1490	C.3	Direction of Traffic	
1285	C.4	Toll	
1483	C.5	NHS Designation	
1485	C.6	STRAHNET Designation	
1487	C.7	Functional Classification	
1022	C.8	Urban Code	
1349	G.1	Tunnel Length	
1401	G.2	Minimum Vertical Clearance over Tunnel Roadway	
1356	G.3	Roadway Width, Curb-to-Curb	
1364	G.4	Left Sidewalk Width	
1367	G.5	Right Sidewalk Width	

WSBIS	NTI Item ID	NTI Inventory Item Name	Comments
1992	D.1	Routine Inspection Target Date	
n/a	D.2	Actual Routine Inspection Date	Inspection dates for routine report type will be reported to the NTI.
n/a	D.3	Routine Inspection Interval	Inspection frequencies for routine report type will be reported to the NTI.
n/a	D.4	In-Depth Inspection	Structures with this report type will be flagged as such in the NTI submittal.
n/a	D.5	Damage Inspection	Structures with this report type will be flagged as such in the NTI submittal.
n/a	D.6	Special Inspection	Structures with this report type will be flagged as such in the NTI submittal.
1554	L.1	Load Rating Method	
1556	L.2	Inventory Load Rating Factor	
1553	L.3	Operating Load Rating Factor	
1293	L.4	Tunnel Load Posting Status	
1560	L.5	Posting Load – Gross	
1561	L.6	Posting Load – Axle	
1562	L.7	Posting Load – Type 3	
1563	L.8	Posting Load – Type 3S2	
1564	L.9	Posting Load – Type 3-3	
1402	L.10	Height Restriction	
1408	L.11	Hazardous Material Restriction	
1409	L.12	Other Restrictions	
n/a	N.1	Under Navigable Waterway	Washington state has no tunnels under waterways, autogenerated for the NTI submittal.
n/a	N.2	Navigable Waterway Clearance	Washington state has no tunnels under waterways, autogenerated for the NTI submittal.
n/a	N.3	Tunnel or Portal Island Protection from Navigation	Washington state has no tunnels under waterways, autogenerated for the NTI submittal.
1510	S.1	Number of Bores	
1511	S.2	Tunnel Shape	
1512	S.3	Portal Shapes	
1513	S.4	Ground Conditions	
1514	S.5	Complex	